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GENERAL BOARD OF HEALTH.

MEDICAL COUNCIL.

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REPORT

OF THE

COMMITTEE FOR SCIENTIFIC INQUIRIES

IN RELATION TO

THE CHOLERA-EPIDEMIC OF 1854.

Presented to both Houses of Parliament by Command of Her Majesty.

LONDON:
PRINTED BY GEORGE E. EYRE AND WILLIAM SPOTTISWOODE,
PRINTERS TO THE QUEEN'S MOST EXCELLENT MAJESTY.
FOR HER MAJESTY'S STATIONERY OFFICE.

1855.

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REPORT.

To the Right Hon. the President of the General Board of Health.

SIR, London, July 14th, 1855.

SOON after your having constituted a Medical Council to advise the Board of Health on matters relative to the then prevailing epidemic of cholera, this Council thought it convenient for the despatch of business that subjects referred to them should be distributed among certain committees of their number; and on this plan we, the undersigned, were requested to become a committee for the scientific purposes of the Council.

Two special duties accordingly devolved on us: *first*, to suggest the institution of particular scientific inquiries which we thought likely, by bettering medical knowledge of the disease, to strengthen the public resources for its prevention and cure; *secondly*, to review, as laid before us, the various fruits of this investigation, and to submit to you our judgment of its results.

While proceeding to report to you on our fulfilment of this task, we beg to acknowledge very gratefully the kindness and confidence with which you have honoured us, in instituting all the inquiries we ventured to suggest, and in procuring from other departments of Government whatever assistance could conduce to our success.

At the same time, we ask indulgence for much that is unavoidably imperfect in our work. To do such things fitly, all needful organization must be prior to the emergency; it would be vain to expect that observations begun in the crisis of an epidemic should have that completeness which science requires, and which only deliberate preparation can ensure. We need hardly remind you that the re-constitution of the General Board, under which you became its President, was effected only on the 12th of last August; that the first meeting of the Medical Council was only on the 6th of September; and that we were appointed a committee two days later—already in the tenth week of a pestilence which some days previously had

attained its utmost extension, and was now in process of decline.

If, however, we cannot speak with unmixed satisfaction of the materials which are before us, we can at least point to their nature and extent as in the highest degree encouraging to future exertions, more extended, more systematic, and more continuous.

Our principal aims, and the methods by which their attainment was sought, have been as follows:—

I. with a view to the DESCRIPTIVE HISTORY OF CHOLERA, we have examined the larger *statistics of this invasion;* as to the places wherein the disease chiefly prevailed; as to the influence of age, sex, and employment in favouring its attack; and as to its own pathological stages and periods;—

II. in the hope to gain more precise knowledge of the CAUSES OF THE DISEASE, we thought it of primary importance that the *air and water of the metropolis* during the epidemic period should be studiously observed, and that special inquiries should, as far as possible, be made into the state of these universal influences in districts actually infected with cholera;—and

III. with the object of increasing for our profession the present insufficient resources of MEDICAL TREATMENT, we have endeavoured to procure comparative *records of various therapeutical experience*, successful or unsuccessful, and have invited from persons versed in such inquiry an elucidation of those questions in the *practical pathology of cholera* which appeared to us most urgent for solution.

FIRST SECTION.

Statistics.

OF statistical material, the following has been before us:

1. We have derived from the General Register Office a *list of all deaths* registered during the epidemic period as caused by cholera or diarrhœa, with particulars as to the

age, sex, and residence of each sufferer, the date of death, and, in many cases, the duration of fatal illness.

2. As the *returns of certain circular forms* (A. and B.) distributed by the Board, we have received from more than 300 medical practitioners, whose names we append to our report, an immense mass of detailed information; and to this we cannot advert without offering our tribute of respect to the public spirit which led so many members of our profession, solely for the general good, to incur an additional task during days of overwhelming occupation. These returns relate to 4,271 cases of cholera and 20,301 of diarrhœa. Besides particulars hereafter to be mentioned in respect to the treatment of the disease, there is contained in them pathological information as to its stages and periods, as to the universality or relative frequency of certain symptoms, as to the prospects of death or recovery at each step of its progress.

From the above sources we gather the following facts of the late epidemic visitation—the third which London has suffered from Asiatic cholera.

(i.) *Progress and Fatality of the Epidemic.*

The summer of 1853 witnessed its commencement.* At that time, as the temperature rose in July, diarrhœa, as well as the common form of cholera, became fatal here; and a few deaths from cholera in the Asiatic form were registered in August in the low districts by the side of the river. Several deaths by the disease occurred in September; and in October, while the temperature fell, and diarrhœa decreased from 723 in August to 283 in October, the cholera spread and became more fatal, so that the deaths by cholera were 335 in October, and 288 in November. On the last day of October 25 persons died of the disease; but subsequently the epidemic subsided, so that towards the close of November the deaths did not exceed four daily; in the month of December the deaths were 43; in January (1854) one death only happened at intervals on each of seven days; one death was recorded on the 10th of February, one on the 25th, and one on the 26th; no death by cholera occurred in March; only four in April, four in May, and three in June.

* Earlier in the year, the disease had prevailed in the ports of the Baltic and on the shores of the German Ocean.

Diarrhœa, however, although it had declined, never ceased; no day in the six first months of the year was without a death, and on some days as many as 8, 10, and 12 deaths by this form of disease were recorded; but it exhibited no disposition to increase. Yet, warned by the course of the former outbreaks, fears were entertained of the more formidable secondary visitation; which were unfortunately justified by the event, for in the eleven days after July 4th, ten persons died of cholera; on the 16th, four died of the disease; and the deaths ran up towards the end of the month until 53, 41, and 44 died on the last three days; on August 1st, 72 persons died of cholera; which continually spreading and multiplying in its course, the deaths on the last day of August were 211. The deaths in July had been 371 by diarrhœa, 308 by cholera; in the month of August the deaths by diarrhœa amounted to 1,022, by cholera to 3,513. No abatement was observed, but the epidemic raged more violently, and the deaths by cholera alone on the 1st of September were 389; on the 2nd, 459; on the 3rd, 329; or 1,177 in the three days, beside 126 deaths by diarrhœa. The eruption had now reached its culminating point; but it subsided slowly, for 4,371 lives were destroyed by cholera and diarrhœa in the first fourteen days of September, while in the month the deaths by cholera were 6,084, by diarrhœa 990. The epidemic declined rapidly in October, and the deaths fell from 70 by cholera on the 1st day, to 3 on the 30th day, making 823 in the aggregate, besides 426 by diarrhœa. In November the deaths by cholera were 52; in December 5, namely, one on the 2nd day, one on the 5th, one on the 6th, and two on the 22nd day. The deaths by diarrhœa in the two months were 175 and 113. The plague was stayed, but it had destroyed in one or other of its forms seventeen thousand people. Such is a rapid sketch of this remarkable epidemic, which can be traced in the annexed Tables, through its fatal course, day by day, from July 1st, 1853, to the end of the year 1854. (*See* Table I., Second Series.)

(ii.) *Estimated Number of Attacks.*

The deaths by the disease were all registered; and the names, ages, occupations, death-dates, and death-places of

its victims are all recorded in the books of the General Register Office. The list of the killed is therefore complete; but what was the number of the wounded? What number of the people was attacked by cholera, and what number suffered and recovered from diarrhœa? No complete return of the cases exists; but the forms of return (A. and B.) which were issued by the Board of Health, and filled up in a manner so creditable to the medical practitioners of London, enable us to form an estimate, which cannot differ much from the actual facts.

Thus, the medical returns show that of 3,188 recorded cases of cholera, 1,467, or 46 per cent., terminated fatally; so it may be inferred from this proportion that, as 11,661 persons died, about 25,000 were attacked by cholera. The mortality of the cases in the hospitals was 51 per cent. ($\frac{763}{1502}$); the mortality of cases that were treated at home was 42 per cent. ($\frac{704}{1686}$); and some deviation further still from the average may have actually occurred in the whole population, but the estimate is true within certain limits. Again, 5,271 cases of diarrhœa were recorded in detail, distinguishing the ages, and 87 were fatal, or the mortality among persons actually attacked by diarrhœa was at the rate of ·0165, about 1·65 per cent. And 17,351 cases, 109 deaths by diarrhœa (·00628) may be noted, if we count the additional cases that are returned in numbers without being separately entered. The deaths in London from diarrhœa were 6,258, so it is evident that only a small proportion of these fatal cases—occurring chiefly in children and old people—attracted the attention of the medical observers. But we are already justified in inferring that, as 6,258 died, some *hundreds of thousands* of the population were attacked by the disease.

The medical returns show the power of recovery from an attack of cholera at different ages; so that 35 deaths at the age 15 to 25 imply that 100 persons of the age have been attacked; at the age 45 to 55, 50 deaths imply 100 attacks; at the advanced age, 75 to 85, 71 deaths by cholera imply 100 attacks. So it is with diarrhœa. And if the proportional numbers of deaths to cases in the medical returns are applied to the total deaths that were registered at the corresponding ages, the result gives the number that were attacked at all ages by cholera as 24,917 persons; by diarrhœa of some severity as 329,778; by diarrhœa of so slight a nature as to be only

brought casually under medical observation, about 519,487; making 874,182 persons in the aggregate who were touched by the epidemic, while 1,642,866 persons escaped unscathed. The estimate of the slight cases is based upon imperfect observations; and we set it down here as a mere indication of the wide influence of the epidemic. (*See* First Series, Table XII.; Third Series, Table VIII.)

The aggregate number of deaths by diarrhœa and by cholera in the medical returns was 1,576, of cases 20,648; and if the estimate is taken on these proportions, it will follow that the 17,919 deaths by the two forms of disease imply less than 235,000 cases; but it is evident on the face of the returns that the slighter cases of diarrhœa were in many instances unrecorded, and consequently the severer forms of cholera were returned by the medical observers in a higher proportion than they actually occurred; we have, therefore, made the above estimate on the separate returns. There can be no doubt, however, that, as is subsequently shown, the great majority of the registered deaths from diarrhœa were deaths from cholera in one of its modified forms; and that both these deaths and all those registered as deaths from cholera, should be taken as representing the mortality of one epidemic disease, including cholera and diarrhœa. To arrive at a correct estimate, however, of what the rate of mortality of the entire disease (including cholera and diarrhœa) is, a large addition must be made to the above number of cases for cases of diarrhœa omitted.

London, in the middle of the year 1854, contained about 2,517,048 people; whom we may conceive to be distributed in equal groups of 10,000. The epidemic diffused itself over each of the 251 myriads; and if *one myriad* is taken to represent the average danger and suffering of the whole, it appears that 71 died; namely, 46 by cholera, 25 by diarrhœa; 99 having probably been attacked by cholera, 1,310 by diarrhœa of some severity, and a still larger number (perhaps 2,064) by slighter forms of disorder. It may, indeed be assumed that in one period or other of the epidemic every individual fell more or less under its influence; while to some, however, who tasted the poison, it was only the cause of a temporary derangement, to others who drank of the chalice to the dregs it was the bitterness of death.

In the years 1840–1 the deaths from diarrhœa in London

amounted to 452 and 465; in the four years 1842–5 the deaths fluctuated from 704 to 834; and since the year 1846 this disease has, in the years when cholera was not epidemic, been the cause of death to 2,000 or more of the inhabitants, and must have attacked 100,000 of them annually, or 75,000 more than it did in 1840–1. Summer cholera, within the same period, also became more prevalent; 60 deaths were ascribed to that cause in 1840, and 162 in 1852. A certain number of the deaths from diarrhœa and cholera in the period of the epidemic are therefore referable to these diseases in the old form, and a certain number to the form acquired since the hot summer of 1846. No inconvenience will, however, arise in the subsequent inquiries if the rate of mortality is calculated on the population in 1854, and on the deaths from cholera and diarrhœa in the period from July 1st, 1853, to December 31st, 1854.

During the epidemic many persons labouring under chronic diseases are attacked by diarrhœa and cholera, which prove fatal in a certain number of instances; and in the abstracts that we have had made from the public registers these cases are counted, although the original primary disease was of a fatal nature. Our numbers, therefore, will exceed the numbers referred to diarrhœa in the Registration Tables.

(iii.) *Local Differences of Cholera Mortality.*

The rate of mortality all over London is represented by the deaths of 71 persons in a myriad people in average conditions of exposure. We cannot investigate the mortality in each of the 251 myriads of which London is composed, but we have the means of determining in the usual way the mortality in each of the 36 registration districts, containing populations varying from one (Hampstead; 11,986) to sixteen (Pancras, 166,956) myriads. Here the hospitals interfere to some extent; but a correction has been made by distributing the 800 deaths in the hospitals over the several districts, in the proportion of the deaths that occurred out of the hospitals in each district, so that the disturbance from this cause cannot be considerable. A similar inquiry has been undertaken, for the sake of comparison in each of the 135 sub-districts into which the 36 districts are subdivided; and some cor-

rection has been made for the deaths from cholera in the workhouses, which in certain districts were used as cholera hospitals. (*See* Second Series, Tables III., IV., VI.; Third Series, Table I.)

The districts, arranged in the order of the rate of mortality from cholera, display a regular series of numbers expressive of that rate, ranging from 6, 10, and 11 at one extreme, to 142, 165, and 179 at the other extreme; so each myriad of the people in the different localities of this great city suffered differently, and the observations present us with these enormous disparities in the sufferings of the thirty-six large congregated masses. The range in the rate of mortality by diarrhœa is much less considerable; it extends from 11, 12, 17, in some districts, to 39, 53, and 54, in a myriad inhabitants, in other districts.

(iv.) *Influence of Density of Population.*

The population of London stands on 78,029 acres of ground, so that in 1851 there were on an average 30 persons to an acre. In Lewisham there were 2 persons, in Wandsworth 4, and in Hampstead 5 persons to an acre; the mortality to 10,000 from cholera in these districts was at the rate of 22, 85, and 12 in 1853–4; and 30, 100, and 8 in 1849 in these open districts. In the three densest districts there were 246, 256, and 290 persons to an acre; the mortality from cholera was at the rate of 10 in St. Luke, of 22 in the Strand, and of 23 in the East London City district, in 1853–4; of 34, 35, and 45 in the same districts in 1849. The mean mortality by cholera is, in the two epidemics, at the rate of 43 in the three most open districts, 28 in the three most dense districts.

Again, in the nine districts of Lewisham, Wandsworth, Hampstead, Camberwell, Hackney, Kensington, Poplar, Greenwich, and Rotherhithe, the mean density of the population ranges from 2 to 21 persons on an acre; the mean mortality in the two epidemics was at the rate of 65 by cholera, by diarrhœa 22, in 10,000.

And in the nine densest districts, Whitechapel, St. George in the East, the West London City, St. Giles, St. James, Holborn, St. Luke, the Strand, and the East London City, where there were on an average from 196 to 290 persons on an acre, the mean mortality in the two epidemics was, by cholera 41, by diarrhœa 19, in 10,000.

The mortality by the two forms of disease was 85 in the nine open to 58 in the nine dense districts.

The mean mortality by cholera and diarrhœa, in the 18 most open districts (40 in 10,000), is nearly the same as (42 in 10,000) the mortality in the 18 most dense districts.

If the 135 sub-districts are arranged in the order of their density, the result is similar; the fatality of the epidemic being highest, however, in the districts of an intermediate degree of density. The cholera matter was evidently diffused over every sub-district of London, but it does not appear that the great differences in the density of the habitations of the people exercised any decisive influence on the intensity of its operation, appreciable, at least, by this method of investigation. Its effect was, perhaps, masked by other more potent agencies. This is the more remarkable as the fatality of large classes of disease has been found to increase in a given ratio to the density of the population; and it may be inferred that cholera is not, like some such cases, communicated by the breath from person to person. (*See* Third Series, Tables I., II., III.)

(v.) *Influence of Elevation.*

The population of London is distributed over the low ground on both sides of the Thames, and over a great number of elevations and depressions, which ascend from the south bank of the river up to Blackheath and Norwood, and from the north bank up to Highgate and to Hampstead. The four lowest districts, Newington, Rotherhithe, St. George Southwark, and Bermondsey, are on or below the level of the Thames at high water; the mortality by cholera to 10,000 in these districts was at the rate of 112, 165, 121, and 179 in the last, and 144, 205, 164, and 161 in the previous epidemic.

Hampstead, Islington, Marylebone, and St. Pancras are at average elevations of 350, 94, 87, and 73 feet above the Thames, and the mortality by cholera in these highest districts was at the rate of 12, 11, 17, and 10 in the last, of 8, 22, 17, and 22, to 10,000, in the former epidemic.

The mean mortality by cholera to 10,000 in the two epidemics was at the rate of 156 in the four lowest districts, 15 in the four highest districts. The mortality by *cholera and diarrhœa* to a myriad of population was 189 on the low districts, 34 on the high districts.

If the thirty-six DISTRICTS of London are arranged in the order of their elevation above the high-water mark of the Thames, the mortality by cholera is found not to be invariably in each district inversely as the elevation; but by taking groups of districts together in the two epidemics, a nearly regular series is obtained: thus, the mean mortality by cholera was, to every myriad, 156 in the districts on or below the level of the high-water mark, 91 in the districts of 3 and under 20 feet of elevation, 44 in the districts at 20—40 feet, 36 in the districts at 40—60 feet, 23 at 60—80 feet, 17 at 80—100 feet, and 10 at 350 feet of elevation. (*See* Third Series, Table I.)

The mortality by diarrhœa was at the rate of 33 on the lowest ground, 26 on the second terrace, 19 on the third terrace, 18 on each of the three higher terraces (20—100 feet), and 10 on the highest terrace. Thus, the mortality by diarrhœa varies less than the mortality by cholera at different elevations. Upon the two highest terraces the diarrhœa is as fatal as the cholera; upon the lowest ground the cholera is four times as fatal as the diarrhœa.

The relation between the elevation of the dwelling-ground and the intensity of the epidemic is seen in the annexed Tables of the Third Series.

(Table IV.) Of the 135 SUB-DISTRICTS, arranged in regular order from the highest to the lowest in London;

(Table V.) Of these sub-districts grouped together in fourteen terraces;

(Table VI.) And of the same sub-districts grouped in six terraces of elevation. The form is the same as the corresponding Tables in the Registrar-General's weekly tables; but the mortality is deduced from the deaths by cholera and by diarrhœa in the 18 months, July 1st, 1853, to the end of 1854; and certain corrections are made for the increase of population and for the disturbance that the deaths in hospitals and workhouses occasioned. The results in the Table V. and Table VI. present a near approximation to the true rates of mortality in the 135 sub-districts; and though differing in details, are of the same character as the results that have been deduced above by grouping the 36 districts. (Table I.)

The mortality from cholera (1853½—4) was at the rate of 13 to a myriad in the highest, 137 to a myriad in the lowest sub-districts (Table V.); the mortality in the same sub-districts from diarrhœa was 21 in the highest,

34 in the lowest; and it will be recollected that *one* death from cholera represents about *two* (2·2) cases of cholera, while *one* death from diarrhœa represents about *sixty* cases of diarrhœa of some severity; consequently the cases of diarrhœa and cholera together must at these rates have been about 1,288 to a myriad in the higher regions, and 1,741 in the lower regions of London. But if it be assumed, as is not impossible, that the cases of diarrhœa and cholera were less fatal on the elevated sub-districts than the cases on the low grounds, then the proportion of persons attacked in the respective regions would differ much less considerably: for, if 1 in 35 cases of diarrhœa was fatal in the lower regions, and 1 in 70 was fatal in the higher regions, the proportional number of persons that were attacked by diarrhœa or cholera in each must have been about 1,490 in a myriad of the population; and taking intermediate proportions, a similar result is obtained for the regions at intermediate elevations.

The distribution of choleraic attacks (though in widely different degrees of frequency, and perhaps also of severity) throughout the whole metropolitan area, seems to establish that the *cholera-leaven*, be it what it may, was scarcely less diffused in the districts that suffered the lowest mortality, than it was in the districts where the disease was tenfold more fatal.

But while the presence of this *leaven* seems to have been universal throughout the districts of the metropolis, the consequences excited by its presence have greatly varied in different localities: and independently of any hypothesis, it may now be stated as the experience of two epidemics in London, that such local varieties of effect, grouped into masses for comparison, have been more nearly inverse to the elevation of soil in the affected districts than proportionate to any other general influence that we could measure.* Thus, approaching London

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* The following formula is from the Report to the Registrar-General on the Cholera of 1848–9, p. lxiii.:—Let e be any elevation within the observed limits, 0 to 350 feet; c be the rate of mortality from cholera at that elevation; also let e' be any higher elevation, and c' the mortality at that higher elevation. Then, if the mortality from cholera is inversely as the elevation, we shall have the proportion,—

$$(1.)\ e : e' :: c' : c = \frac{e'}{e}, c'.$$

By adding a constant element, a, the velocity at which the mortality increases can be retarded to any extent. The equation then assumes the form,—

$$(2.)\ \frac{e' + a}{e + a} c' = c, \text{ or } (3.)\ c' = \frac{e + a}{e' + a} c.$$

along the roads from the surrounding country, and descending through the successive regions, succeeding each other in circles, down to the waters of the polluted Thames, we see, in the epidemic, the people fall upon the right hand and upon the left in numbers that increase on every circle, and express arithmetically the growing force of those physical influences, on which the poison of cholera apparently depends for its powers of existence or of development.

The annexed diagram exhibits to the eye the relative intensity of the cholera in the sub-districts of various elevations; it also exhibits a regular curve, with which the series observed closely agrees, except in the part which includes the observations in the Berwick Street and Golden Square sub-districts.

(vi.) *Mortality of Attacks of Diarrhœa and Cholera in its various Forms.*

The medical returns already adverted to, contained more or less complete information of the kind indicated by the Forms A, B, which were drawn up by us, in the midst of the epidemic. Those returns came to hand at distant intervals from the London Hospitals, from private practitioners, and from country districts; and the various sets of returns have been made available, as far as it was practicable, for the various branches of this inquiry; thus 24,572 cases, namely, 4,271 of cholera, and 20,301 of diarrhœa, were brought under our observation. The mortality by cholera in the several sets of English returns, ranged from 41 to 51 deaths on every 100 persons attacked; the mortality from diarrhœa ranged from ·6 to 1·8 on every 100 attacked, (or without decimals, from 6 to 18 on every 1,000), as is shown in the annexed Table:

The value of a in general terms is,—

(3.) $a = \frac{c'\,c' - e\,c}{c - c'}$, and it was taken at 13.

$e + a$ and $e' + a$ represent the abscissas, c and c' the ordinates of the curve. The central perpendicular line in the diagram corresponds to the abscissas, the horizontal lines to the ordinates of the curve, which was calculated from the mean mortality (145) on the lowest ground ($e = -1$), *one* foot below Trinity high-water mark. The equation was, therefore,—

$$\frac{a-1}{a+e'} \cdot c = \frac{13-1}{13+e'} \times 145 = c' = \frac{12 \times 145}{13+e'} = \frac{1740}{13+e'};$$

the e' being made the variable.

TABLE (C.) of MORTALITY of attacks of CHOLERA in several Groups of Returns.

	Number of Cases.	Deaths.	Mortality. Deaths to 100 Cases.
(1.) Cases from all sources -	4,271	1,948	45·6
(2.) Cases in London Hospitals -	1,502	763	50·9
(3.) Cases in private practice, London - - - -	1,686	704	41·8
(4.) Total of (3.) & (4.), or of the London Cases - -	3,188	1,467	46·0
(5.) Cases in the provincial towns and districts - -	586	238	40·6
(6.) Some cases in Scotland -	497	243	48·9
(7.) A selection of all cases in which the connexion of collapse Cases, or Cases without collapse, with consecutive fever, could be traced - - - - -	3,596	1,767	49·1
(8.) Of the above (7.) were cases of collapse* - - -	2,431	1,627	66·9
(9.) Of the above (7.) were cases without absolute collapse	1,165	140	12·0
(10.) All cases in which age was specified - - -	3,611	1,749	48·4

TABLE (D.) of MORTALITY of Cases of CONSECUTIVE FEVER following CHOLERA (included in No. 7 of Table of Cholera Mortality).

	Number of Cases.	Deaths.	Mortality. Deaths to 100 Cases.
All Cases of consecutive fever -	874	249	28·5
Of the above were :—			
(1.) Cases following collapse -	633	220	35·0
(2.) Cases following cholera without collapse - -	241	29	12·0

* The numbers are taken from the Tables IV. and V., First Series.

TABLE (E.) of MORTALITY of Attacks of DIARRHŒA, Simple or Choleraic.

	Number of Cases.	Deaths.	Mortality. Deaths to 100 Cases.
(1.) Cases from all sources -	20,301	156	·77
(2.) Cases treated in London hospitals - - -	688	8	1·16
(3.) Cases not treated in London hospitals - - -	16,772	101	·60
(4.) Sum of cases in London -	17,460	109	·62
(5.) Cases in the country towns and districts where cholera was epidemic - -	2,176	40	1·84
(6.) Some cases in Scotland -	665	7	1·05
(7.) Cases in which age was distinguished - - -	5,271	87	1·65

From another extended series of returns that were procured through the Poor Law Board of Scotland, it appears that the mortality in that country among persons attacked by cholera, was 47·5 in 100; for out of 14,430 cases, 6,848 terminated fatally. This result agrees closely with the general result of the English cases, of which 45·2 in 100 were fatal. (*See* First Series, Table XIII.)

If we assume for a moment that all the cases commence as diarrhœa, we may infer that of 142,351 persons attacked of all ages, a certain number, say 132,351, suffer from diarrhœa of some severity, and that after the lapse of a certain number of days 2,512 die, 129,839 recover: but 10,000 enter the stage of cholera, and may then be divided into two great classes: 3,240 of the *first class*, who do not fall into collapse; 309 of their number dying, 2,261 recovering, while 670 pass into consecutive fever, 81 to die in, 589 to recover from, that stage; and 6,760 of the *second class* who do fall into collapse, 3,913 dying in that stage, from which, however, 1,087 recover straightway, leaving 1,760 who pass into consecutive fever, in which 612 die, and from which 1,148 recover: thus of the 10,000 that we follow in their perilous journey, 6,760 fall into collapse, 2,430 fall into the fever; of the 6,760 who fall into collapse, 4,525 die either in that stage or ultimately

in the fever stage: of the 3,240 who do not fall into collapse, as many as 390 die: of the 2,430 who pass into the fever 693 die.*

If a single patient is regarded, these numbers will assist in prognosis, as they express the degrees of danger to which he is exposed; thus upon being attacked by unequivocal cholera, the probability is slightly in favour of recovery (·5085); but the chance is two to one that he will fall into collapse, and then it is two to one that he will not recover; if, however, he survive this stage and pass into the fever, it is more than two to one that he will recover. It is seven to one that the patient who does not fall into collapse will recover, and if he pass into the fever he has such an advantage that it is seven to one in favour of his recovery, while, as is before stated, it is only two to one in favour of the recovery from the fever of a patient who has been in collapse.

Such, it must be recollected, is not the natural course of these two forms of disease, but their course under the systems of treatment now in practice in England: and what is the result of the English practice?

The great object of the physician or surgeon in every stage of the malady is to save the patient's life, and with this object in view, to prevent the diarrhœa from passing into cholera, the cholera from falling into collapse. Now it has been seen that of 142,351 persons attacked, about 129,839 recover, while only 10,000 of the cases become cholera, 6,760 fall into collapse.

The question, how far these proportions have been affected, for better or for worse, by various methods of treatment, empirical or rational, has been under the con-

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* The following are the data from which the above results have been deduced :—

The number of severe cases of diarrhœa, in London, 329,778 (estimated); deaths by diarrhœa, 6,258; cases of cholera, 24,917 (estimated); cases of cholera in which the several stages were distinguished in the medical returns, 3,596, of which 1,767 terminated fatally.—(*See* First Series, Table IV.; Third Series, Table VIII.)

1,165 of the 3,596 cases did not go into collapse; but 111 died, and 813 recovered from this stage.

2,431 cases went into collapse, from which 391 recovered without proceeding further, and in which 1,407 died.

874 of the 3,596 cases passed into the stage of consecutive fever; and as it was observed that of 808 such cases, 223 had been preceded by cholera without collapse, 585 by cholera with collapse, it was inferred that of the 874 cases, 241 had not been preceded, that 633 had been preceded, by collapse.

249 of the cases of consecutive fever terminated fatally; and as it was observed that of 223 cases, 26 had not been preceded, that 199 had been preceded, by collapse, it was inferred that these two latter numbers should be raised to 29 and 220.

In a few rare instances the consecutive fever, it was stated, passed into other forms of disease, which are not brought into account in this illustration of the course of a complicated disease.—(*See* First Series, Tables IV. and V.)

sideration of some of our colleagues, acting as a special committee in this branch of the subject. We, therefore, only remark on one difficulty of the investigation which has been obvious in the materials we have analysed, and has often misled the public into false appreciation of alleged methods of cure. The choleraic pestilence varies in the severity of its individual attacks, from the degree of a trifling indisposition to that of a most deadly and intractable disease. We have seen that in one form it is fatal to 6, in another to 669 in every 1,000; and, therefore, to avoid great mistakes, any alleged specific requires that its effects should be investigated with the greatest care, through extended and, above all, trustworthy observations. When persons not accustomed to accurate investigations attempt to compare together the results of various treatment, as tested by death or recovery, they are seldom sufficiently on their guard against the immense fallacy of leaving unexpressed the *degrees of disease* against which this or that medicine has prevailed.

(vii.) *Duration of Cases of Cholera and Diarrhœa.*

If the first object of medical treatment is to save the patient's life, the second is to shorten his sufferings, and to accclerate his restoration to health. Now the duration of 3,600 cases of cholera, dating not from the commencement of the precedent diarrhœa, but from the first characteristic symptoms of cholera, was by the medical returns 5·9 (nearly six) days: the duration of the 1,744 fatal cases was 2·68 days (more than sixty-four hours); while the duration of the 1,856 cases of recovery was 9·06 days. We may, therefore, inquire of new methods of treatment, do they shorten the periods of the disease, as well as do they diminish the mortality more or less than the present system of practice?

The duration of 9,590 fatal cases of cholera was returned in the registers of deaths, and was on an average 2·39 days; a result differing little from that above, which is deduced from the medical returns.

If the series of changing phenomena in an attack of cholera are viewed collectively, with reference only to the time, dating from the commencement, we find, by a simple construction (*see* Third Series, Table IX.) that of 3,600 cases 816 terminate in one day (twenty-four hours), namely, 82 in recovery, 734 in death; leaving 2,784 cases,

of which 590 terminate in the second day, 162 in recovery, 428 in death; and so on to the 34th day as may be seen in the Table. The same construction shows that the average chance of recovery increases every hour, every day, from the commencement of the attack, at first rapidly, and then slowly: so that while it is only 1,856 to 1,744 in favour of recovery at the onset, it is 1,744 to 1,010 in favour of recovery if the patient survive twenty-four hours; the patient alive at the end of the second day, though still ill, has the chances of 1,612 to 582 (almost three to one) in favour of his ultimate recovery; at the end of ten days his chance of recovery is 636 to 109 or six to one: so that to gain time, is one great aim in the treatment of this disease, which destroys, in the first twenty-four hours after the manifest characteristic symptoms, *one* in every five that it attacks.

The probability that a patient suffering from an attack of average severity will die or recover in the attack is shown in Table XI. of the Third Series. In the doctrine of probabilities, certainty, it will be recollected, is expressed by *unity* (1), and the various degrees of probability are expressed by fractions, so that if an event can only terminate in one of two ways, the sum of the two fractions that measure the respective probabilities is 1·0; as by hypothesis the case must certainly terminate in one of the two ways. Thus, by the Table, the probability that a cholera patient will die of the attack at first is nearly $\frac{48}{100}$ or ·48; at the end of two days the probability is reduced to ·27, at the end of the seventh day to ·16, at the end of nineteen days to ·07. The probability of ultimate recovery increases as the probability of dying decreases, and is at the corresponding dates ·52, and ·73, and ·84, and ·93.

The Table IX. (Third Series) shows at a glance the probability that a patient suffering from an attack of average severity will recover *on*, *before*, or *after* any day of the disease; and will serve, therefore, either to guide an insurance office in insuring the life of a patient or to direct the physician in determining the effects of various systems of treatment. We shall not pursue this branch of the inquiry further into details, which can only be made clear by the aid of mathematical symbols. But we may here remark, as the same method is applicable to all diseases, that medicine is a science of probabilities, having observation for its basis; and depending, therefore, for its success on the application of the same methods of analysis as are

applied in the other sciences to facts observed on some such extended system as we have endeavoured to illustrate in conducting the inquiry into the laws to which an epidemic disease is subject.

The average duration of 5,271 cases of *diarrhœa*, chiefly of recoveries in the medical returns, was five days, while the duration of 4,150 cases in the registers of deaths was 13 days, these being all severe and more protracted diseases, occurring chiefly in young and in very old people.

The duration of cases of *cholera* is by the medical returns nearly 6 days, of cases of diarrhœa nearly 5 days; so that the two forms differ little in duration, and the 329,778 cases of severe diarrhœa, which, if we take the previous estimate, occurred in London, imply about 1,648,890 days of sickness, while the 24,917 cases of cholera imply 149,502 days of sickness.

(viii.) *Influence of Age and Sex.*

The influence of age on the course of cholera is striking; thus in infancy and advanced age the form of diarrhœa is relatively and absolutely more frequent than it is in the middle period of life, as at that age the spasms and the collapse are more evident than they are when the muscular system is feeble.

The danger of an attack of cholera varies with age; thus at the age of 15–25, out of 100 persons attacked 34·9 die; at the age of 25–35 the deaths to 100 cases are 35·4; at 65–75 the deaths to 100 cases are 58·2. The mortality of cases of diarrhœa also varies at different ages.

In another series of tables the mortality that cholera caused in the population at various ages is shown from the facts of the two epidemics. (*See* First Series, Table XII.; Second Series, Table X.)

The mortality among the male population was at the rate of 47, among the female population at the rate of 45 in 10,000.

(ix.) *Variations of Fatality during the progress of the Epidemic.*

The fatality of the cases of cholera diminished in the progress of the epidemic, so that the disease apparently assumed towards its close some of the characters of diarrhœa; as is shown in the annexed tabular statement of cases returned in London:—

Period of the Epidemic.		Cases.	Deaths.	Deaths to 100 Cases.
Fortnights.	Dates.			
	Total Cases - -	3,188	1,467	46
1	July 2—15 - -	6	2	33
2	July 16—29 - -	41	24	59
3	July 30—Aug. 12 -	272	141	52
4	Aug. 13—26. - -	420	181	43
5	Aug. 27—Sept. 9 -	980	509	52
6	Sept. 10—23 - -	921	393	43
7	Sept. 24—Oct. 7 -	377	151	40
8	Oct. 8—21 - -	118	54	46
9	Oct. 22—Nov. 2 -	39	9	23
10	Nov. 3—16 - -	14	3	21

If periods of four weeks are taken, it will be found that the fatality of the cases in the returns decreases progressively as the epidemic advances, from July 16 to Nov. 16.

(x.) *Comparison of Mortality in the two Epidemics.*

The last, like the previous epidemic, extended over portions of two years; and the deaths, which were not very numerous in 1853, slightly exceeded the deaths in 1848. The deaths by cholera and diarrhœa in 1854 were, however, 5,000 less than the number that would have been told, had the epidemic been as fatal as the epidemic of 1849, allowing ten per cent. for increase in the population.

Years.	Deaths by Cholera.	Deaths by Diarrhœa.	Deaths by Cholera and Diarrhœa.
Year 1849 - - - - - - - -	14,137	3,899	18,036
Deaths that *would have happened* if the population had been the same in the year 1849 as it was probably in 1854 - - -	15,587	4,299	19,886
Year 1854 - - - - - - - -	10,806	4,000	14,806
Reduction of the mortality in 1854 as compared with that of 1849. - - -	4,781	299	5,080

The second outbreak began later in the season in the last epidemic than it did in the epidemic of 1849; and the

diminished figure of the mortality arises from the smaller number of deaths in the months of July and August. The disease had lost none of its virulence, and the deaths by cholera in September 1854, being 6,084, exceeded the deaths (5,031) in September 1849 by 1,053. The daily deaths by cholera in the two epidemics at the maximum, were 336 on September 4th, 1849, and 459 on September 2nd, 1854.

If it is considered that the interval between the epidemic of 1831–2 and 1848–9 was *seventeen* years, and that the epidemic which we have recorded followed the second epidemic after an interval of only *five* years, it is evident that the public apprehension for the sanitary state of London should suffer no abatement, but that the most active and complete measures should be adopted to prevent the approach or to mitigate the violence of impending visitations.

Second Section.

Ætiology.

A.—*Atmospheric Causes.*

In reference to the *atmospheric conditions*, general or partial, which prevailed during the epidemic visitation, we have received reports, as follows, viz.:—from Mr. Glaisher, of the Royal Observatory, Greenwich, on the meteorology of London; from Dr. R. D. Thomson and Mr. Rainey, both of St. Thomas's Hospital, on certain chemical and microscopical investigations of air; and from officers of the Board of Health on the sanitary inspection of particular districts in the metropolis.

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1. Mr. Glaisher's Report is of peculiar interest. It presents the result of meteorological diaries kept, not only at ten stations previously existing, but at thirteen others specially established for the occasion; so that from the date of Mr. Glaisher's commission, observations more or less complete were made at no fewer than twenty-three sites in our vast metropolitan area. In reducing these multifarious observations, Mr. Glaisher's "first step was the examination of every reading in comparison with all others taken at or about the same time; the second was the application of index errors, corrections for diurnal range, and all necessary corrections and calculations to

deduce the mean daily value of each element of investigation. The weekly means of the daily values were next taken, and tables formed," exceeding fifty in number, as the basis of Mr. Glaisher's conclusions. From circumstances already adverted to, this admirable system of observation could not be completely organized till the epidemic had attained its climax; so that some gaps unavoidably remain in what, even with this deficiency, is a most valuable contribution to science.

Although Mr. Glaisher's report is in our Appendix, we think it needful here to present a short summary of its results; and we append a table which displays some of them in a compendious form:—

Deaths from Cholera.	*Weeks* ending as follows;	Atmospheric Pressure.			Mean Temperature in excess.	Humidity.		Density of Atmosphere in excess.	No. of Calm Days.	Proportion of cloud, *covered* or (clear sky, 0).
		Total.	Aqueous.	Total in excess, monthly mean.		Max. 100.	Excess, monthly mean.			
4	July 8	29·769	·368	- -	−4·5	75	- -	- -	5	9
6	15	29·853	·388	- -	−5·0	84	- -	- -	4	
33	22	30·114	·441	- -	+1·3	72	- -	- -	3	5
180	29	30·151	·434	- -	+4·1	68	- -	- -	3	
	July	- -	- -	+0·017	- -	- -	−5	+1		
488	Aug. 5	29·864	·429	- -	−3·2	85	- -	- -	1	8
671	12	30·010	·402	- -	−1·7	76	- -	- -	5	
772	19	29·968	·394	- -	−1·3	74	- -	- -	6	
869	26	30·067	·398	- -	+0·7	73	- -	- -	2	
	Aug.	- -	- -	+0·104	- -	- -	−39	+2		
1,646	Sept. 2	30·371	·455	- -	+6·3	73	- -	- -	7	3
1,869	9	30·335	·371	- -	+2·5	72	- -	- -	7	
1,527	16	30·014	·425	- -	+4·1	80	- -	- -	2	6
1,182	23	30·115	·388	- -	+2·7	80	- -	- -	0	
658	30	30·250	·342	- -	+1·2	76	- -	- -	6	1½
	Sept.	- -	- -	+0·109	- -	- -	−57	+2		
398	Oct. 7	29·878	·349	- -	+2·1	80	- -	- -	3	6
227	14	30·198	·330	- -	+1·0	83	- -	- -	2	4½
143	21	29·652	·280	- -	−2·5	82	- -	- -	2	7½
48	28	30·685	·268	- -	−2·2	83	- -	- -	5	5
	Oct. -	- -	- -	+0·058	- -	- -	−16	+1		
25	Nov. 4	30·275	·319	- -	+3·6	84	- -	- -	3	3½
16	11	30·275	·247	- -	−1·7	83	- -	- -	1	6
10	18	29·625	·250	- -	−1·0	88	- -	- -	1	8½
5	25	29·568	·215	- -	−4·5	88	- -	- -	0	8
	Nov.	- -	- -	+0·003	- -	- -	+31	+5		
4	Dec. 2	29·686	·216	- -	−2·5	83	- -	- -	0	6
2	9	29·810	·239	- -	+1·5	83	- -	- -	0	5
0	16	30·029	·248	- -	+3·1	84	- -	- -	0	6
2	23	29·767	·236	- -	+1·8	87	- -	- -	0	7
0	30	30·125	·225	- -	+1·6	86	- -	- -	0	5
	Dec. -	- -	- -	−0·069	- -	- -	−17	−4		

Mr. Glaisher's inquiries have related to the *pressure of the atmosphere*, total and aqueous; to its *temperature*, mean and extreme; to its *moisture*, absolute and relative; to its *density;* to the directions and amount of its *movements;* to the *chemical and electrical* influences that act in it; to *haze, fog, mist*, and *rain-fall.*

(i.) The corrected weekly means of the observed *readings of the barometer* had been considerably in excess of their average during February, March, and April; but in the three months next following they presented no important deviation, and only became remarkable towards the end of August. The atmospheric pressure had then risen much above its normal amount, and during the worst period of the epidemic was more continuously great than at any other time. From the 25th of August to the 10th of September the reading was above 30 in.; and on three days in this period as high as 30½. The mean reading for the two months exceeds the corresponding amount in any year of Mr. Glaisher's series; and it is the more noticeable since (as will presently appear) less than the usual effect was due to watery vapour.

(ii.) During the early part of 1854, the *mean daily temperature* of the air had been higher than normal; its excess, for the first 101 days of the year, averaging 3°·4. There had then set in a very cold period, injuring vegetation and killing many hardy plants; and for the ninety-seven days terminating July 19th there had been a daily defect of temperature, averaging 3°·3. The next few days showed a sudden increase of heat; the 25th of July was the hottest day of the year, its temperature rising nearly to 90°, and exceeding the normal by 11°. Three weeks of cooler weather followed; but from the 19th of August to the 11th of October (within which time were the worst ravages of disease) there was an excess of heat, averaging 2°·6 for each of the fifty-four days; and during one week of this period (that ending the 2nd of September) the excess amounted to 6¼°. After the week ending the 14th of October, and excepting the week ending the 4th of November, the temperature was below its average till December.

(iii.) The *extremes of daily temperature*, and the range between them, have been noted by Mr. Glaisher carefully, and with some curious results. From the Greenwich observations it appears that, except June (which was

slightly in defect) every month of the year showed an excess above the average of diurnal range; March, April, and especially September being most remarkable in this respect; and the total result of this is, that, while for the thirteen years ending 1853 the mean yearly diurnal range was 14°·6, the range for 1854 was 18°·1, being 3½° above the average. But in comparing the extreme readings of the Greenwich and other outlying stations with those of London proper, Mr. Glaisher discovers the startling fact, that his central stations undergo a much less daily range of temperature; that, because of the dense veil which overhangs them, they, during day-time, cannot get equal heat from the sun, nor during night-time can equally cool themselves into space. Such excesses of night-temperature have amounted in the weekly mean to 7°, 8°, 9°, and 10°; and as between particular stations, to 15° and 20°; a period marked by this extreme difference having extended but for twelve nights' interval, from the 26th of August to the 4th of September.

Remembering that, amid the districts which most of all present this high night-temperature, there is spread the vast evaporating surface of the Thames,—a river which (so far at least as London is a drained city) represents the main sewer of our metropolis,—remembering, that from its putrescent banks and waters there arise vapour and miasm in proportion to that level of temperature, we must recognise the full right with which Mr. Glaisher insists upon this feature of our London climate. Almost uninterruptedly, too, the heat of the water is some degrees greater than that of the superincumbent air; for 28 consecutive nights, ending September 12th, this excess averaged 16°·3; and there was another fortnight, beginning a few days later, during which it averaged 16°·5. At such periods we may (as Mr. Glaisher expresses it) infer the water to have been simmering, and the whole area of the Thames to have been giving off incessant and vast volumes of vapour, which, unsustained by the colder air, hovered over the city, thickened its atmosphere, occasioned the frequent prevalence of fog and mist, and explained the less daily range of temperature in stations overshadowed by its influence.

(iv.) The *vaporosity of the atmosphere* is estimated by a twofold standard; first, what quantity of vapour is actually holden in the air—how many grains per cubic foot—and what share does its weight contribute to the total of baro-

metric pressure? next, how near does that vapour approach to its own limit of maximum density—the limit at which (unless its temperature be raised) it admits of no further evaporation into it? An answer to the first question expresses an *absolute* quantity; an answer to the second, a *relative* quantity; and it is requisite to observe this distinction, because, on some damp wintry day for instance, the atmosphere may be within a shade of aqueous saturation, while in actual weight of water it scarcely holds the half of what, at higher temperatures, would leave it still capable of considerable drying-power. According to both standards, however, our atmosphere, during the chief prevalence of cholera, was less full than usual of aqueous vapour. In July, August, September, and October, it was further than usual from saturation; and from June to November it contained, in weight of vapour *per* given measure of air, $\frac{1}{20}$th less than its average.

(v.) In every month, excepting January and December, the *density of the atmosphere* has been in excess; the mean weight of a cubic foot of air having, for the year, been 2 grains above its average.

(vi.) With respect to the *movements of the atmosphere*, Mr. Glaisher's observations relate to the direction of winds, their mean force and velocity. From July 1st to September 11th the wind came alternately from S.W. and N.E. with nearly equal frequency, but with a difference of force greatly in favour of S.W.; in the next 28 days its direction varied more, but on 19 of them was W.S.W.; from October 11th it was W., and remained a compound of west to the end of the year. The daily motions of the air, irrespective of their direction, were much under the average; there was a defect in July of 34·3 per cent., in August of 25·7, in September of 15·3, in October of 29·3, in November of 32·8, from the respective averages of daily horizontal movement. Of the 123 fatal days, from July 1st to October 31st, there were 65 on which calm more or less prevailed; and it appears, as a fact of great interest in relation to the severity of the epidemic, that in the low-lying districts the air was at all times in much less motion than in those of higher level; entirely stagnant in the former, whenever in the latter it was noticed as calm; and when, at these, some hopeful wind blew with a pressure of 23 ounces, those suffering districts got but a sixth of the breeze.

(vii.) From July to the end of the year there were but

few *thunder storms;* in fact, no great electrical disturbance took place from the time of the first outbreak of cholera in July, so long as the disease continued. Hail was noted on one day only within the same interval of time, viz. on October 23rd. So far, therefore, as the electrical observations indicate, in connexion with the much less than usual number of electrical disturbances in these months, it is inferred that there was a general deficiency in the tension of the common positive electricity prevalent during the period. No observations upon the electricity of the atmosphere were made till the disease was at its height; at this time the electricity was positive but weak, and continued so till the end of September. Positive electricity, with tension somewhat greater than in September, was present at stations of moderate elevation, always except when rain was falling, in the months of October, November, and December. Common atmospheric positive electricity has therefore been as prevalent as usual. At stations situated nearly on a level with the river Thames, the electricity was generally weaker than at stations of higher elevation, and was more frequently negative.

(viii.) From August 24th till September 4th there was no *ozone* at any station near the metropolis, and very little at any station over the country; a little was shown on September 5th, and from this time onward was general. At all stations of low elevation its amount has been insignificant, and at many near the river not a trace of it has been detected throughout the whole epidemic period; while at places of high elevation it has nearly always been shown, and at intermediate stations occasionally; seeming to graduate itself according to level, and to increase as we ascend from lower to higher ground.

(ix.) *Haze, fog, mist,* were singly or together prevalent on five days of July and eight days of August. The beginning of September was ushered in with a dense blue mist; this in the second week of the month (when cholera was still at its height) was exchanged for a thick atmosphere of fog, which continued with little intermission till the end of the month, and at low places prevailed both day and night. During all this time, the distance was misty, middle-distance indistinct, and sunshine pale and watery; but occasionally the atmosphere became partially translucent, and for awhile, in the higher levels of London, buildings would seem defined with remarkable clearness. The same kind of weather continued in October; and

mist, fog, or haze, in or about London, was recorded on 19 days of November and 21 of December. The fortnight ending September 9th, and the week ending September 30th, were the periods, subsequent to July 1st, in which the sky was least overcast with *clouds*.

(x.) Of *rain*, there was a deficiency in every month of the year excepting May and December; and the whole year's amount was one quarter short of its average. Of 136 days following July 1st, there were 93 on which no drop of moisture fell, and 25 others with but very trifling rain. The crisis of the epidemic was in the droughtiest period.

Mr. Glaisher has given additional value to his report by furnishing some particulars as to the meteorology of the epidemic periods of 1832 and 1849. In those years no observations were made at central points in the metropolis; and, therefore, it is only in respect of outlying stations that the meteorological phenomena admit of strict and detailed comparison. The records of 1832 relate to the atmospheric pressure and temperature, to the direction of the wind, fall of rain, clearness of sky, and frequency of electrical disturbances; those of 1849, except for their non-mention of ozone, admit of almost complete comparison with the present series. Mr. Glaisher's summary of these comparisons is in the following words:—

"The three epidemics were attended with a particular state of atmosphere, characterized by a prevalent mist, thin in high places, dense in low. During the height of the epidemic, in all cases, the reading of the barometer was remarkably high, the atmosphere thick; and in 1849 and 1854, the temperature above its average. A total absence of rain, and a stillness of air amounting almost to calm, accompanied the progress of the disease on each occasion. In places near the river, the night temperatures were high, with small diurnal range, with a dense torpid mist, and air charged with the many impurities arising from the exhalations of the Thames and adjoining marshes, a deficiency of electricity, and, as shown in 1854, a total absence of ozone, most probably destroyed by the decomposition of the organic matter with which the air in these situations is so strongly charged.

"In both 1849 and 1854, the first decline of the disease was marked by a decrease in the readings of the barometer, and in the temperature of air and water; the air, which previously had for a long time continued calm,

was succeeded by a strong S.W. wind, which soon dissipated the former stagnant and poisonous atmosphere. In both periods at the end of September, the temperature of the Thames fell below 60°, but in 1854 the barometer again increased, the air became again stagnant, and the decline of the disease was considerably checked. It continued, however, gradually to subside, although the months of November and December were nearly as misty as that of September. By the close of the year diarrhœa and cholera had subsided, but a high rate of mortality still continued."

It now remains for us to appreciate, one by one, in their relation to life, the several meteorological deviations which Mr. Glaisher records. And this is no easy task; for the pathological meaning of many atmospheric variations, at least in their minor degrees, is hitherto quite unknown. What effect is produced on human life by an inch rise or fall in the barometer, by fluctuations of humidity and dew-point, even by seasons of non-average temperature, is very imperfectly measured. Still less is known of the chemical activities of the atmosphere. We know, indeed, that this boundless ocean of air is, in one-fifth of its volume, *oxygen;* the gas, which more or less rapidly brings all organic compounds into simpler chemical forms, exhausting those qualities that make putridity, and terminating those transitional states in which the powers of morbid infection resides. But there is every reason to believe that the oxidizing power of the air varies at different moments, as assuredly it varies at different spots. *Electrical discharges*—the frequent source of such variations—constantly occur in the atmosphere, developing in it, wherever it extends, that mysterious increase of its oxidizing power which is called *ozone;* a qualification of the air so subtle in its kind, that chemists still doubt whether it be a separate entity; yet in its function so definite, so hostile to organic miasms, so incompatible with them, that its presence enables us to affirm their absence; for wherever it meets them it must be spent in disinfecting their unwholesomeness, neither leaving of them any residue unneutralized, nor itself remaining free, except as predominant force have been on one side of this conflict or on the other. It is likewise probable that the great acts of aerial renovation are modified by the powers of *solar light*, wherein our world floats and revolves; since in every ray of it there are chemical

influences, capable of affecting in turn each breath of the atmosphere they traverse. But these parts of the subject are of recent and unfinished discovery; our means of observation in regard of them are hitherto far from complete; and it would be premature to do more than point to such influences, and to their possible fluctuations, as a field for future most important inquiry.

How requisite is such research, may easily be illustrated. Mr. Glaisher, in whose personal observations we should repose full confidence, informs us, that he can by sight estimate certain differences of mist, which he identifies with corresponding differences of epidemic sanitary condition; that he can connect one tint of mist with the prevalence of cholera, another with the prevalence of influenza; yet that, except for this rude test of colour, he cannot discriminate those mists, and has no hygrometric or other meteorological knowledge of their existence.

Amid such uncertainties, we only venture to glance at the less obscure aspects of this interesting investigation.

The *undue height of the barometer* is an indication to which Mr. Glaisher draws particular attention, as having generally prevailed at the worst moments of each epidemic. During August and September 1854, it stood above its average from $\frac{1}{10}$ to $\frac{1}{5}$ in.; but lest undue importance should be attached to this one element, it must be noted, that in February (when there were but three cholera deaths) it had ranged nearly $\frac{3}{10}$ in., and in March (when there was no such death) more than $\frac{2}{5}$ in. above its average. We know of no direct influence which these atmospheric changes can have produced on human life, nor of any they can have exerted on the rate or kind of chemical change; but to a limited extent (as implying greater density of air) they would operate against vaporous diffusion, and in this degree may be probably estimated as favourable to the stagnation of miasm.

Of the immense *influence of heat* it is scarcely requisite to speak, in respect either of its well-known faculty to accelerate chemical changes, or of the many other differences that follow its range—the rarefaction of air, the lessening of humidity, the excitement of evaporation. Despite some exceptions, probably less real than apparent, it seems that Asiatic cholera, and indeed bowel-poisons generally, are favoured by high temperature; and in comparing together our two last epidemics, with a parallel comparison of their seasons, we are struck with the fact

that in 1854, when the summer temperature began later than in 1849, and quite abruptly rose to its maximum, so too the curve of mortality in that epidemic was peculiar,—seeming to imitate the summer temperature in its deferred commencement and sudden rise.

The *less range of London temperature* is a most important fact. It belongs not so much to our lesser heat by day as to our greater heat by night; it means that London, though in the daytime somewhat less sunned than the outlying districts, sustains by night a considerable excess of temperature, with that more continuous activity of chemical decomposition which such an excess implies; and this influence is the more important, as it is predominantly felt in those low alluvial districts, where the material for decomposition is most rife.

Of *fog, mist, and haze*, in their mere hygrometrical relations, we know nothing to affect life; but it is requisite to remember that when these hang over districts of London—condensed in their ascent from the "simmering" river and filth-sodden soil—they represent not mere clouds of aqueous vapour, but, too probably, other products of terrestrial exhalation, delayed in their transit to space and withheld from the diffusion they had commenced.

The great *predominance of calm* was doubtless of baneful effect. It is a familiar matter, not only for households but for countries, that free ventilation is an indispensable condition of health. As individuals suffer their temporary inconvenience, when detained in unventilated rooms, and grow poisoned and cachectic if such be their habit of life; so, in recesses of the earth's surface, where, amid great mountain-chains, the ponded air lies unruffled by free whirls of wind, whole communities abort in the stagnant atmosphere, and beget a cretin, goitrous population. In respect of local impurities and the mischief they may engender, no miasm can survive an adequate commixture with air; and in relation to the severity of epidemic disease, it is impossible to doubt that the more or less vehemence of aerial circulation is a variant of the utmost importance.

As leading results of Mr. Glaisher's inquiry, two facts stand in relief:—

1, that the year 1854, and other years when cholera has prevailed, have had their marked meteorological characters, the general tendency of which has been to render

the season defective in those atmospheric changes which renew the purity of air;

2, that these characters, apparently so definite in their meaning, are in their kind such as to prevail with greatly increased development in those low levels of London where all visitations of cholera have most cruelly pressed; for high barometric pressure, excessive night-temperature and hazy air, with absence of wind, of ozone, and of electricity, would all (as the station-tables show) appear in their most marked degrees throughout those alluvial districts:

And, when these two statements are compared, it seems probable that in the atmospheric conditions of the year (or in some unknown influence essentially joined with them) there has been an important factor for the problem of that epidemic mortality.

In concluding our account of Mr. Glaisher's researches, we would submit one more extract from his paper:—"I have little hesitation in saying, that were the meteorology of our towns carefully ascertained and collated with that of the metropolis, and both together with that of the country generally (of which last I have a foundation of many years' continuous observations) that in a short time we should be in a condition to elaborate a clear insight into the meteorological causes of cholera, influenza, and many phases of disease which now burst upon us with the suddenness and devastating power of a divine and wrathful visitation."

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(2) SPECIAL EXAMINATIONS OF THE ATMOSPHERE were to some extent conducted, both chemically and microscopically, with the object of determining, in reference to the causation of the disease, whether any peculiar organic forms or unusual chemical products could be detected, either in the general air of an infected locality, or in its sewer-gases, or in the immediate atmosphere and exhalations of the sick.

The spot chosen for these observations was in the low-lying district of St. Olave, Southwark, where the epidemic had great prevalence, and where the wards of St. Thomas's Hospital gave the observers every facility for the requisite access to infected persons. The experiments were conducted by Dr. Thomson and Mr. Rainey, whose respective reports are contained in our Appendix, and whose method consisted in examining (the former chemically, the latter

miscroscopically) certain quantities of distilled water and of sulphuric acid, through which had been drawn, by a well-devised suction-apparatus, large volumes of the air which it was wished to investigate.—

From these examinations appeared as follows, viz.:—

(i.) In the atmosphere of a ward filled with cholera patients, while the disease was at its height, there were diffused various substances; some not possessed of life—the familiar dust of an inhabited room,—minute hairs, particles of smoke, epidermic scales, vegetable fibres of different kinds and colours, starch granules, &c.; others distinctly having life, and showing growth or movement. Of the latter, Mr. Rainey reports, that they had the appearance of small flocculent masses, visible to the naked eye, in the fluid in the bottom of the vessel; that, examined at the same time by Dr. Thomson and himself, they were found to consist of the mycelia of fungi, apparently in an active state of vegetation, mixed with the dusty impurities before mentioned; that he could discover no appreciable difference between these growths and the mycelia of fungi which had formed in solutions of vegetable substance after exposure to the air where no cholera was present; that besides the fungi, there were extremely minute, colourless, indistinctly beaded fibres (resembling in their general character that form of *Vibrionia* called *bacterium*) so abundant as to cover some of the larger branching fibres of the mycelium; and that these he does not recollect to have seen on mycelia growing in astringent vegetable solutions prepared for the purpose of producing fungi. Dr. Thomson adds, that this air gave very evident chemical signs of containing organic matter.

(ii.) In the atmosphere of a ward, only partially filled with cholera patients, when the disease was very much on the decline, the dead and living form, separated by filtration, were of the same kind as those just described; but the vibrionic fibres were much less numerous than in the former observation.

(iii.) In a third examination, made when cholera had left the district, and when, consequently, the ward was empty, dust particles were found, with the mycelia of fungi in considerable abundance, and apparently in active vegetation; but Mr. Rainey, with very careful search, could find no trace of the vibrionic forms.

(iv.) In the external atmosphere adjacent to the hospital, various dusty impurities were observed, as also sporules

and fungi to a considerable extent, but no vibriones. The collection of this air for examination began on the 21st October.

(v.) In air collected from within a sewer during twenty-seven days, beginning 22d November, there was found less dusty admixture than in the upper air. Vibriones were seen in much larger quantity than in any of the previous specimens, traversing the field of the microscope with great rapidity, and fungi were also present.

(vi.) The water through which sewer-gas had passed was strongly alkaline with ammonia, the result of organic decomposition; while the other specimens gave a powerful acid reaction, apparently from products of combustion contained in them.

The above results of a local examination have, at present, little more than a negative interest. The presence of fungi and their sporules in the atmosphere, appears to have had no relation whatever to the proximity of cholera patients, to have continued in the ward when vacated of all inmates, and to have been found in the exterior air (including that of the sewer) when cholera had long ceased to be epidemic in the district and in the metropolis. More importance might at first sight seem to belong to the presence of vibriones in the air, especially since they diminished when cholera patients were fewer in the ward, and vanished when no such patients remained. Yet, considering what is generally known of the habits of these peculiar forms, we cannot conclude that this was an essential coincidence. The development of vibriones is intimately related to animal decomposition; and the discovery of their profuse existence in sewer-gas, when cholera was no longer present, illustrates how they may multiply in an air that is loaded with organic miasm. These creatures are far too habitually about us for it to seem probable that they represent any new element in the causation of disease. We suspect that their diffusion in the cholera ward at the time of Mr. Rainey's first examination (when that ward contained its full complement of patients) simply indicated that the air was profusely charged with animal exhalation; that subsequently their existence varied with the number of persons occupying the ward; and that under similar conditions of temperature, ventilation, and cleanliness, they would have been equally abundant, though the inmates had been suffering from other disease.

We cannot pass this very interesting part of our subject without expressing our regret that researches of so much importance could not have been commenced at an earlier date, and been made more comprehensive in their scope. Many reasons will appear in the course of our report, to justify us in saying that a very complete and exact inquiry into the chemistry of organic decomposition during the epidemic prevalence of cholera—especially into the successive transformations of animal refuse at such times—might furnish all-important information as to the characteristic poison of the disease. It was with this belief that we suggested the necesssity of submitting sewer miasm to examination; but from circumstances, quite beyond control, this part of the inquiry could not be undertaken till the time had passed for finding in it the solution we desired.

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3. VALUABLE INFORMATION relative to local atmospheres has been gathered from other sources than direct chemical analysis. Nine sanitary inspectors were employed to visit all the localities most severely affected with cholera; and Dr. John Sutherland, late Superintending Inspector of the Board, has compiled from their statements an account, which is already before Parliament.*

From Dr. Sutherland we learn that "all the inspectors agree in stating, as the result of their experience, that in those districts where cholera had become localised they found it connected with obvious removable causes"—these causes, so far as relates to the present subject, being such as affect the purity of the air, by loading it with the miasms of decomposing organic matter; that in considerable parts of the metropolis "there are large masses of population dependent for their drainage on open ditches, tidal ditches, old badly-constructed sewers, and still worse house-drains,—the result of the whole being that the *excreta* of a large part of the metropolis are not conveyed away, but are left to putrefy and rot in the open air, in cesspools under houses, or in large underground sewers, always generating foul gases, which are poured out into the streets or into the houses while in the more open districts the exhalations from the ditches keep the atmosphere in a con-

* Letter of the President of the General Board of Health to the Right Honourable Viscount Palmerston, accompanying a Report from Dr. Sutherland on epidemic cholera in the metropolis in 1854; presented to both Houses of Parliament by command of Her Majesty.

stantly malarious condition;" that "the sewerage of all the localities is in a most imperfect condition;" that "a great sanitary evil incident to districts south of the river is the reflux of the tide through the sewers at high water, not unfrequently flooding the basement of houses, and in some parts rising in the gully-grate up to the level of the street;" that from the discharge of our metropolitan sewage into the river, "the banks at low water are in a filthy state" and "the exhalations from these pestilential banks of mud under a hot sun are most injurious to the purity of the air;" that "the pavement of courts and alleys is in general very defective, their gutters and those of the smaller and poorer streets badly constructed, retaining foul water before the doors of the houses;" that "the narrow back streets are very imperfectly cleansed, and the courts and alleys at ordinary times entirely neglected;" that bitter complaints are made of the non-removal of house refuse, which, with its various organic contents, is liable, for want of a properly organized system of dustmen, to remain as a nuisance for weeks; that in large districts of the metropolis there is "total absence of any comprehensive plan of laying out ground for building purposes, with a neglect of all arrangements for ensuring a free circulation of air round dwelling houses, and the existence of numerous narrow overcrowded courts and alleys, many of them mere *culs-de-sacs;*" "that in all the poorer classes of dwellings the means of ventilation are defective in the highest degree, the accommodation wretched and confined, the houses overcrowded and badly lighted, intermingled with private slaughter-houses, cowhouses, stables, pigsties, and public privies;" that "cellar dwellings are still in use in many parts of the metropolis;" that "the influence of noxious trades and nuisances in predisposing to attacks of cholera has been observed during the late epidemic;" dust-contractors, bone boilers, and gluemakers being specially mentioned, with "the effluvia proceeding from filthy stables, cowyards, and pigsties," and instances being referred to where whole families, exposed to such agencies, have been attacked, and in part fatally, by choleraic disease.

In contrast to the above characteristics of places in which cholera has prevailed, Dr. Sutherland refers to the condition of certain spots that have enjoyed a disproportionate immunity from the disease, apparently in result of sanitary amelioration. He cites instances where, at low levels in the metropolis and amidst a general infection of

the district, such an exemption has been enjoyed by particular groups of houses, which in former visitations had shared an equal lot with the rest, but which in the interval since those visitations, at the suggestion of a fatal experience, had had removed from within their atmosphere certain definite sources of contamination.

In the same sense it is reported that in common lodging-houses, formerly (by reason of overcrowding and filth) the fields of rich harvest for choleraic death, there has now, under that system of police-regulation which is due to Lord Shaftesbury's Act, appeared so little evidence of such infection, that Dr. Sutherland thinks it "necessary to make some allowance for imperfect information on the subject."

Similarly, among 2,791 persons who, at various points of the metropolis, were living under the auspices of societies for improvement of the dwellings of the poor, only six deaths by cholera occurred; of which one seemed due to an exterior infection, one to a poisonous supper of stale crab, and the remainder (which were all in a single family) to some cause evidently of most limited operation.

The cases of Bethlem Hospital and the City House of Occupations, on which Mr. Lawrence has favoured us with a memorandum (Appendix, No. V.) give their share of testimony to the same effect: these well regulated establishments, with their population of 700 persons, having suffered no death from cholera while it prevailed most intensely around them.

The instance of the city of London, with 130,000 inhabitants, suffering in the late invasion 71 per cent. less cholera mortality than in 1849, is another illustration which Dr. Sutherland might have adduced of the epidemic lessening its pressure on a population in proportion as the sources of atmospheric impurity have yielded to sanitary improvement.

B.—*The Water-supply of London.*

Inquiries into the water-supply of houses and districts suffering from cholera have been conducted under two heads, respectively *Chemical* and *Microscopical*.

1. The first of these, entrusted to Dr. Thomson, has given results, the sum of which, as regards our supply by the great trading companies, is embodied in the following table:—

GRAINS of ADMIXTURE per Gallon in WATERS of the under-mentioned COMPANIES.

—	I. Lambeth Company.	II. Grand Junction Company.	III. West Middlesex Company.	IV. Chelsea Company.	V. Southwark and Vauxhall Company.	VI. New River Company at New River Head.	VII. New River Company supplied to Soho, from a well near the Hampstead Road.	VIII. East London.	IX. Kent Company.
1. Organic Matter -	1·390	1·920	2·080	5·410	3·640	2·330	1·980	1·940	1·480
2. Silica - -	·350	·090	·520	1·511	·240	·180	·780	·320	·420
3. Sesquioxide of Iron, Alumina, and Phosphates - -	·215	·730	·460	·639	·460	·400	·210	·520	·130
4. Carbonate of Lime -	10·144	8·870	9·919	9·550	10·700	11·985	7·085	11·997	9·540
5. Sulphate of Lime -	2·149	2·368	2·109	6·432	3·179	1·326	1·523	·897	3·085
6. Chloride of Calcium -	—	—	—	—	1·363	—	—	—	—
7. Nitrate of Lime - -	trace	trace	trace	trace	·076	trace	trace	trace.	trace.
8. Carbonate of Magnesia	0·592	0·720	·720	·438	0·500	·855	1·185	·743	·210
9. Carbonate of Soda -	—	—	—	—	—	trace	4·909	—	—
10. Sulphate of Magnesia	—	—	—	1·390	—	trace	trace	trace	trace.
11. Chloride of Magnesium	·617	·542	·360	1·947	2·101	trace	—	·237	·949
12. Sulphate of Potash -	·730	·553	·577	2·903	2·413	:884	1·266	·682	1·153
13. Sulphate of Soda -	—	—	—	—	—	—	8·051	—	—
14. Chloride of Sodium -	·966	·947	1·637	29·797	16·001	2·355	7·807	1·125	·874
Total - -	17·153	16·740	18·443	60·017	40·673	20·315	34·796	18·461	17·841
Residue by Evaporation	17·440	16·920	18·970	60·170	41·780	20·780	35·050	18·300	17·760
15. Carbonate of Ammonia	·064	—	—	—	·840	—	—	—	—

In regard of the mineral impregnations shown in the above analyses, two features deserve particular notice; first, in all the specimens, that large quantity of lime-salts to which London water owes its costly and inconvenient property of *hardness;* secondly, in the two waters (IV. and V.) which are derived from the Thames at Battersea, the remarkable evidence given by chemical analysis, that an admixture from the sea reaches to this distance inland, and renders the river *brackish* with chloride of sodium.

Much significance belongs to what is set forth in the first line of the table—the proportions of *organic matter* dissolved in the several waters. Here great differences present themselves; for, as we compare together, in the first five columns, those waters which are drawn from the Thames, we observe that the admixture of such matter increases from 1·39, where the source of supply is at Thames Ditton, to 5·41, where it is at Chelsea. With the fact of this increase we remark that other materials, nitric acid and ammonia, have simultaneously risen into sensible quantity,—materials which are derived from the conversion of animal products. Without anticipating the demonstration presently to be founded on the microscopy of these waters, and even setting aside our knowledge of where the sewers disgorge into the river, it is already easy, on chemical evidence, to say that the Southwark and Vauxhall and the Chelsea Companies, pump their supply from a source profusely contaminated with the refuse of animal life.

With respect to water-supply generally, nothing can better prove a liability to foreign admixture than any *uncertainty of composition;* and Dr. Thomson, having for the most part made repeated analyses of waters severally purporting to be one in kind, observes, that the supply of each company, examined at different times, shows extensive fluctuations of impurity. The following table exhibits the range of such differences, as noted by him; and he adduces these facts to explain how widely his own report differs from that* on which was founded the legislation of 1852,—the latter (he says) deducing its conclusions from samples of water drawn under too favourable circumstances, and strangely representing, as least contaminated with foreign

* Report on the Chemical Quality of the Supply of Water to the Metropolis, by Professors Graham, Miller, and Hofmann; presented to Parliament by Her Majesty's Command. 1851.

matter, those which were taken nearest to London and most under influence of the tide.

GRAINS *per* GALLON of FOREIGN ADMIXTURE in the under-mentioned COMPANIES' WATERS.

Lambeth.	Southwark and Vauxhall.	Chelsea.	New River.	East London.	Kent.
12·12 to 17·98	22·50 to 72·66	36·96 to 65·66	15·75 to 35·05	17·02 to 19·60	15·02 to 21·10

2. The microscopical examinations, conducted by Dr. Hassall, form a necessary supplement to the chemical inquiry; and in referring to his results we will only premise that water, scrutinised with the highest magnifying power, reveals, if pure, no visible shapes whatever, and that consequently all such shapes discoverable by the microscope do, in their several kinds and grades, constitute a foreign impurity.

Having examined many specimens of water obtained from houses wherein one or more of the occupants had suffered from cholera; such water being supplied by the Southwark and Vauxhall, the Lambeth, the Kent, the East London, the New River, the Grand Junction, and the Chelsea Companies; Dr. Hassall reports among his results—

That the whole of the numerous specimens of water subjected to examination contained organic matter, dead and living, animal and vegetable; that the quantity and kinds of organic matter varied considerably in different cases, but were usually more or less constant for the same water; that the waters which contained the greatest number and variety of productions, dead and living, were from houses supplied by the Southwark and Vauxhall Company, that these abounded in living animal and vegetable forms of different genera and species; containing also a large quantity of dead organic matter, amongst which were frequently to be detected fragments of the husk of wheat, hairs of the same, starchy matters of different kinds, cells of potato and other vegetable tissues, with, in some cases, fragments of altered muscular fibre—these latter structures and elements being undoubtedly derived from the fæcal

matter contained in the sewage; that the same species of organic productions were present in the waters obtained from houses supplied by the Chelsea Company, although in greatly diminished numbers—a result which might have been expected, since this company derives its supply from the same part of the Thames as the Southwark and Vauxhall Company, but filters it before delivery; that the water procured from houses supplied by the New River, Grand Junction, and East London Water Companies, but especially the two former, all contained a great many organic productions; that the water obtained from houses supplied by the Lambeth Company contained fewer organic productions than any of the rest; that amongst the productions present in the water of the Southwark and Vauxhall, the Chelsea, and the West Middlesex Companies are several which are found only in brackish waters; that the specimens taken from cisterns supplied by the Southwark and Vauxhall Company were very impure indeed; far more so than any of the other waters examined, some of them being demonstrably contaminated with fæcal matter.

Most of the above expressions describe the respective waters as drawn for domestic consumption, from the various butts and cisterns to which the companies supply them; and as these receptacles for the most part favour the development of infusorial life, at the expense of dead organic matter, it may be assumed that the same waters drawn from mains or service-pipes might have presented larger quantities of dead tissue or excrement, and less maturity of living organisms. It hardly needs to be remarked, however, that butts and cisterns (however objectionable may be their use) cannot originate animal or vegetable growth; and the derivation of such products is made obvious by Dr. Hassall's statement of what he observed in proceeding to the very sources of supply, and examining the waters of the Thames, the New River, and the Lea; viz., that organic matter, both dead and living, animal and vegetable, was present in very considerable amount in the whole of these waters; and that the living forms were discovered in considerable numbers, not merely in the deposit, but in nearly every drop of each of the waters, after they had stood the usual time, and after all but the lightest solid matter and the most active living infusoria had consequently subsided.

3. Both Dr. Thomson's and Dr. Hassall's inquiries have

extended to the examination of many well-waters in and about London.

In respect of superficial wells—those common sources of pump-water in the metropolis and elsewhere, the testimony now given strongly corroborates all that has frequently been urged as to the dangerous nature of such a supply. Both observers, though from different points of view, discover in these waters just such qualities as might be expected, from their having filtered through a porous soil, full of organic impurities,—that they contain sometimes evident sewage matter, sometimes an abundance of nitrates or of ammonia derived from the decomposition of animal substances, sometimes a variety of those animal and vegetable organisms which attest the progress of decay.

The deep well-waters, in respect of organic contamination, are usually in strong contrast to these; and in many of the specimens examined by Dr. Hassall there were no traces, or barely any, of infusorial life. Where such were found, their presence was to be accounted for by reference to special circumstances; by a communication of the well with some adjoining pond, or by its having had refuse wilfully thrown into it. But for these influences and the like, Dr. Hassall believes, "that scarcely a single organic production of any kind would have been found in any one of the (deep) well and spring waters subjected to microscopical examination." The mere absence of such productions does not in itself establish the fitness of water for drinking, since there may remain various mineral admixtures to render it inconvenient or unwholesome; but both Dr. Thomson and Dr. Hassall refer with praise to the case of Woolwich, as one where a large population is supplied with water which presents an entire freedom from infusorial life, and which, though directly derived from the chalk formation, is artificially softened to about half the hardness of our Thames supply.

From such results, chemical and microscopical, as we have quoted from Dr. Thomson's and Dr. Hassall's reports, still more from their details, for which we must refer to documents printed in our Appendix (Nos. VII. and VIII.), it is evident that the commercial water-supply of London is derived from impure sources.

That furnished by the Lambeth Company is the best. Being taken from the river at Thames Ditton, it fulfils the requirements of the Metropolitan Water Act, and illustrates what after the present year will be supplied, with the sanction of the Legislature, to the greater part of the Metropolis. It is the best, but it is not good. Even in it Dr. Hassall finds "in not inconsiderable numbers, organic productions dead and living, animal and vegetable;" even in it Dr. Thompson finds traces of nitric acid, enough ammonia "to indicate an intermixture of sewage," and such proportions of organic matter as ought not to be insignificant to an educated community.

After the Lambeth Company follow, in the order of deterioration fixed by Dr. Thomson's analyses, the Kent, Grand Junction, East London, West Middlesex, New River, Southwark and Vauxhall, and Chelsea Companies. The last two greatly surpass the others in badness, and between themselves there is this difference:—while both draw from that part of the river, where the water is brackish from marine tides, and where an immense infusion of sewage proceeds uninterruptedly, the Chelsea Company seems to have the worse source for collecting, the Southwark and Vauxhall the lesser care for distributing its supply. Whether because of some greater influence of the tide along the northern side of the river at Battersea, or because of more sewage being discharged on that than on the southern side, the Chelsea water shows a much greater amount of dissolved impurities, but (apparently as the result of filtration) far fewer visible forms; while in the Southwark and Vauxhall water this evidence of unfiltered contamination reaches its highest degree, revealing to the microscope, not only swarms of infusorial life, but particles of undigested food referable to the discharges from human bowels.

It likewise appears from the evidence before us that the superficial wells of London afford a supply which, though often preferred for beverage in houses subject to the payment of water-rate, is generally not superior in quality to that distributed by the companies, and is liable to an aggravated form of the same contaminations.

Such having been the qualities of water consumed in the various parts of London during the late epidemic, it remains for us to examine how far the consumption of

these waters may have influenced the severity of cholera in London.

With respect to the *mineral ingredients* set forth in Dr. Thomson's analyses—although every grain of such admixture represents a deviation from the absolute purity of water—we have no reason for ascribing to them any appreciable influence in the matter adverted to. Considerable quantities of these mixed salts might be taken at a dose without producing serious injury to health; and we have no knowledge that, from their habitual consumption in small daily doses, there results any such chronic ill-effect as we might consider a probable predisposition to cholera.

With respect to the *living animal and vegetable forms* traced by Dr. Hassall through the whole series of waters, there seems no evidence that they, by their own action on the human body, could be productive of choleraic symptoms. There are indeed many instances, human and brute, of disease engendered in the living body through the tenantry of parasitic organisms, animal and vegetable; and, for aught we know to the contrary, many of the creatures described by Dr. Hassall may be capable of sustenance and multiplication within the bowels of those who swallow them. But in every known case where it can fairly be presumed that parasites are the causes of disease, they exist as a palpable morbid product occupying some considerable share of the affected body. The silkworm destroyed by *muscardine* dies because its whole body is riddled with parasitic vegetation, so dense that at last a mere heap of mould remains in place of the absorbed and disorganized animal; and every molecule of that mould makes evident the nature of the destructive process. What we know of parasitic diseases in the human subject—of hydatids and porrigo, for instance—tends all to the same point: in whatever way the foreign occupant have proved hurtful, whether it have starved the proper substance of the body on which it was graffed, or have provoked particular textures to acts of inflammation, or have choked their functions by its pressure,—itself, the causative thing, remains as a material shaped body, susceptible of ocular demonstration, side by side with its effects, and having bulk proportionate to them. Analogy would, therefore, lead us to infer that parasites could produce no attack of exhaustive purging and vomiting, except by having first

along the digestive canal multiplied to such swarms that they would be obvious to the most casual observer, both in the discharges of living patients and in the subsequent examination of the dead.

So far as this argument renders it improbable that the metropolitan water-supply produced cholera by means of the infusorial life engendered in it, the conclusion is strengthened by further remarks of Dr. Hassall's :— "Of the (living) organic products discovered in the waters examined, the great majority belonged to species which are known, and which have been long described in systematic works; and since the greater number of these are present in these waters at nearly all seasons, and since they are, therefore, constantly consumed, it is clear that they are in no way concerned in the production of cholera;"—"the number of those, the names of which were not known or their nature undetermined, was not considerable; and of these there was no one common to all the waters obtained from cholera houses which could be supposed to be influential in any degree in the production of the epidemic."

We do, however, attach very great importance to the fact, that nearly all the waters consumed in London, show a remarkable aptitude to develope low forms of animal and vegetable life; but this importance belongs, in our judgment, not to any direct influence exerted by such organisms on our own, but to the indications which their development affords that the waters wherein they grow are fraught with dead organic impurities.

The admixture of *decomposing organic matter* in the water-supply of the metropolis being attested equally by chemical analysis and by the microscopical evidence just adduced, we do not hesitate to speak of this contamination as one that may have exercised great influence on the spread of cholera among the population. The general history of this disease establishes its infinite preference for localities that are fœtid with organic impurity; and it is impossible to conceive either any specific chemical changes arising in the air of a district, or any morbid action excitable by it in the living body—such changes or such action being due to its contamination by dead organic admixture—without recognizing that the water of the district likewise —great solvent of air as it is—must, if similarly polluted, be liable to undergo the same alteration, and to originate the same effects, as those of the atmosphere around it.

The present state of scientific knowledge does not justify dogmatic assertions on this subject; but there are reasons for believing, in respect not only of cholera, but of many kindred diseases, that the means and agencies of morbid infection stand in intimate relation to decaying animal products within and without the body; and the slightest taint of organic decomposition within the drinking water of a large population, therefore, constitutes a danger, which we cannot but regard with as much alarm as disgust.

If, in concluding our present section, we review the discussed materials in their bearing on the general ætiology of cholera, we think that the facts recorded enlarge the basis of previous knowledge.

The doctrine of epidemic cholera which has gained almost universal acceptance, does not affect to explain what may be that power—the exciting cause of the epidemic manifestation—which at intervals of time has forayed from place to place about our globe, sometimes vaguely spreading over a widened area, sometimes seeming to move in more defined procession, and which now for the third time has shed its fatal influence on our land. But with this mystery still unsolved, there has grown more and more into shape a doctrine which is both intelligible and practical;—that the undiscovered power in its wanderings acts after the manner of a *ferment*, that it therefore takes effect only amid congenial circumstances, and that the stuff out of which it brews poison must be air or water abounding with organic impurity. Taking this as hypothesis, and testing it by the facts before us, we find that it would include and explain them.

Either in air or in water, it seems probable that the infection can grow. Often it is not easy to say which of these media may have been the chief scene of poisonous fermentation; for the impurity of one commonly implies the impurity of both, and in considerable parts of the metropolis (where cholera has severely raged) there is rivalry of foulness between the two. But, on the whole evidence, it seems impossible to doubt that the influences, which determine in mass the geographical distribution of cholera in London, belong less to the water than to the air.

In our statistical section it appears that gradual exemption from the epidemic mortality "has more nearly followed the degrees of elevation of soil than been proportionate to

any other general influence we could measure." But in this lessening scale—varying from a death-rate of 156 beside the river to one of 10 at the highest levels of London —there are so many and so considerable exceptions, as to show that the low level invites the epidemic invasion by reason of some attribute of its position which may elsewhere equally abound. Such an attribute is the excess of organic impurity, which (from the relation of the river to our London drainage) habitually saturates those alluvial parts; but which, through sanitary mismanagement or personal neglect, may prevail against the intentions of nature at the highest levels in the land.

Even among the best-placed parts of London there are districts so habitually foul and unwholesome, that a spectator might wonder whether by any result of tidal drainage the southern flats of the Metropolis can have been rendered more fœtid and poisonous than they. But the meteorological history of London here comes to our aid; explaining how, even if there be equal filthiness in all districts, the poisonous consequences of filth must be inverse to the elevation of soil. For on the supposition (which this result greatly confirms) that the choleraic infection multiplies rather in air than in water, meteorology explains how the balance of healthfulness is weighted in favour of the higher levels, by their less participation in the high night-temperature of the metropolis, by their comparative clearness from mist, and above all by the curative resources of more free ventilation.

Supplementary to the Second Section.

REMARKS ON THE OUTBREAK OF CHOLERA IN SOHO.

ONE local outbreak of the epidemic—that which befel the neighbourhood of Berwick Street—was of such severity as to suggest that some especial causes must be concerned in its production. The circumstances of this remarkable attack have been investigated in a house-to-house visitation of the affected locality; and the results of that inquiry are stated in a Report (App. No. IV.) by the three gentlemen who conducted it—Dr. Fraser, Mr. Hughes, and Mr. Ludlow.

In the three registration sub-districts of St. Anne's, Golden Square, and Berwick Street, together comprising a population of 42,000 persons, it appears that there

occurred 537 deaths from cholera; being at the rate of 128 to every 10,000 inhabitants, while the general cholera rate of the Metropolis was only sixty to the same number.

This high mortality was the more remarkable, as the affected districts are not situated at a low level, nor disproportionately inhabited by a poor population.

A striking feature of the outbreak was its extreme suddenness, as measured by the large number of persons almost simultaneously attacked. Its greatest local diffusion appears to have been reached on the second, if not on the first day, from its commencement; it remained of equal prevalence for two days, and on each of the two following underwent a decline of 50 per cent.

In respect of this explosive appearance of the epidemic, it deserves particular mention, that for some time the district had been enjoying an exemption from disease quite out of keeping with its sanitary condition. Influences, universally recognised to be causes of disease, had been present, but in a manner for which we are unable to account had remained almost inoperative; so that, till the very eve of this dreadful outbreak, the district might have boasted itself as one of average healthiness.

This fact is one of so much interest and importance that we have thought it advisable to have it thoroughly investigated by an inquiry into the mortuary statistics of the last seven years. The death-rate of the district during this period, if we could exclude from it those few days of epidemic visitation, would have been only 20½ per 1,000 per annum; which, though far above what sanitary science can ensure to well-regulated districts, is considerably below our average metropolitan death-rate. Zymotic diseases, too, had made less than ½½ of this total.

It likewise deserves mention, that of the 537 cholera deaths of the late epidemic, 323 occurred in houses which, during the past seven years, had suffered no deaths from other zymotic disease; and in comparison especially with the slight visitation of cholera which this district suffered in 1849, we discover that out of 86 houses in which cholera deaths then occurred, only 10 re-appear in the list of 310 houses in which cholera deaths occurred in the late epidemic. Since these results of our inquiry differ from what has been generally believed of the habits of the disease, we append (*see* p. 119) in detail the tables on which they are founded.

With respect to the causes of this particular outbreak, we find no apparent exception to the conclusions arrived at in the preceding section of our Report. Anticipating that for such an epidemic prevalence of cholera (whatever may have been the foreign influence that excited it) there must have pre-existed a certain local state of uncleanliness with putrefiable matters, we trace no anomaly in the visitation.

That such local uncleanliness prevailed most intensely throughout the suffering districts, is evident from the reported results of house-to-house visitation. The exterior atmosphere was offensive with effluvia from ill-conditioned sewers; the houses were almost universally affected in the same manner, partly from the same source, partly from their own extreme defects of drainage and cleanliness, partly from unregulated slaughtering and other offensive trades; the inhabitants were overcrowded, perhaps to the greatest degree known even in London; and the general architecture of the locality was such as to render it almost insusceptible of ventilation.

On the principles to which we have referred, and which we believe to be commonly recognised as presenting the most probable theory of choleraic irruptions, it will be obvious that the locality, notwithstanding its high level, contained every predisposing condition which (given the exciting cause) should render it prone to a violent epidemic explosion; and we believe that any person conversant with the laws of disease might have predicted its extreme liability to suffer what afterwards befel it.

Why, however, this district should have suffered in marked disproportion to many other districts, hardly, if at all, superior in their sanitary arrangements; or why, generally, it should be the tendency of cholera in its visitation to select particular foci for extreme outbreaks, instead of diffusing itself more equally over all ill-conditioned districts, is a difficulty which hitherto we have no scientific material to solve.

The meteorological conditions of the district were not minutely examined at the time of the attack: but the Reporters' mention of an atmospheric haze, and of a singularly stagnant, sultry, and oppressive air, leads us to believe that, if scientifically observed, they would have been found accordant with the generalizations in Mr. Glaisher's Metropolitan Report.

In explanation of the remarkable intensity of this outbreak within very definite limits, it has been suggested by Dr. Snow, that the real cause of whatever was peculiar in the case lay in the general use of one particular well, situate at Broad Street in the middle of the district, and having (it was imagined) its waters contaminated with the rice-water evacuations of cholera patients.

After careful inquiry, we see no reason to adopt this belief. We do not find it established that the water* was contaminated in the manner alleged; nor is there before us any sufficient evidence to show, whether inhabitants of the district, drinking from that well, suffered in proportion more than other inhabitants of the district who drank from other sources.

There is mentioned, however, a remarkable instance in which it seems probable that the water of this well did really act as a vehicle of choleraic infection; but (assuming the absence of fallacy in the case) this probability might easily be admitted, without its therefrom resulting that infection depended on the specific material alleged. The water was undeniably impure with organic contamination; and we have already argued that, if, at the times of epidemic invasion there be operating in the air some influence which converts putrefiable impurities into a specific poison, the water of the locality, in proportion as it contains such impurities, would probably be liable to similar poisonous conversion. Thus, if the Broad Street pump did actually become a source of disease to persons dwelling at a distance, we believe that this may have depended on other organic impurities than those exclusively referred to, and may have arisen, not in its containing choleraic excrements, but simply in the fact of its impure waters having participated in the atmospheric infection of the district.

Third Section.

Practical Pathology.

One of the earliest duties which devolved on us, as a committee for the scientific purposes of the Medical Council, was to suggest means for collecting and utilising

* Dr. Thomson and Dr. Hassall examined this water, though not at the moment of the outbreak, and their account of it will be found in their respective reports.

the results of detailed medical experience in its individual circles of practice. For it was hoped that, in comparing together the contributions of many independent observers we might educe trustworthy information on various disputed particulars.

We accordingly prepared for circulation among members of our profession the Forms (A. and B.) already adverted to. These were so constructed that the returns, when complete, would inform us not only as to the stages of the disease, their duration, fatality, and relative frequency, but likewise as to each respondent's personal experience in the application of different remedies.

We now account in full for the mass of valuable information received in reply to this appeal. All that related to the history of the epidemic, irrespectively of medical treatment, has been extensively used in the statistical section of our Report, and has furnished material for our first series of Tables. The remainder, recording the therapeutical experience of more than 300 contributors, and representing in this respect an unprecedented multitude of authentic evidence, was deemed of sufficient value to justify its being referred to a special section of the Medical Council, whose report on the results deduced from it is already before Parliament and the public.

There was another class of contribution which we were most anxious to encourage. However painful the truth, we could not disguise from ourselves, as to the advanced stages of cholera, that nearly all resources of medicine seemed equally powerless for good; that practitioners, summoned to the relief of this dreadful disease, could scarcely decide between any two lines of treatment except for an occasional certainty that one of them would positively harm; and we felt deeply assured that—failing some happy chance of empiricism, there could be but one escape from this helpless condition of our art. We believed that the varieties and irresolution of practice corresponded to the actual unripeness of pathological knowledge, to the absence of those scientific principles which alone could give secure and uniform guidance: for, how futile to discuss the hopefulness of this or that experiment in treatment, while our profession was still unfixed as to what action in the suffering body it should be the definite aim of medicine to effect! If better success was to be won, we thought it must be through stricter studies in the nature of the disease, through learning as it were the mechanism of

its production, and appreciating, fact by fact, the full significance of all its symptoms.

During the preceding epidemic, both here and especially on the Continent, researches of great interest and importance had been carried on. Yet a vast deal remained for inquiry; and we hoped it might be conducive to good, that this state of the case should be represented to persons who were likely to take part in scientific investigations.

We accordingly suggested "that there still remain in the pathology of the disease many undetermined particulars; and that in respect of these, great assistance would be given if the physicians of London hospitals, and other officers of public institutions within whose province it falls to be cognizant of such matters, would direct their attention to specific pathological questions, and would communicate to us the results of their inquiry." Being then requested to specify those problems in the disease which we considered most deserving of study, we prepared a *Memorandum* on the subject which was transmitted to the chief medical officer of the various hospitals and infirmaries in the metropolis.

The epidemic, however, had already passed its climax, and soon rapidly declined and ceased. There was consequently little time or opportunity for new scientific observations; and although some of the problems proposed might have been elucidated by the results of experience already gained, no replies were elicited from public institutions, except *St. Bartholomew's*, *St. Thomas's*, and the *Middlesex* Hospitals, and the *City of London and East London* Dispensary. Nor, independently of our appeal, did the practical pathology of cholera during its recent visitation appear to attract any active scientific research. In the epidemic of 1848-9, new methods of investigation had been most zealously employed; and in 1853 the subject had lost its novelty, even for the younger cultivators of pathological science.

Reports bearing on different points of the inquiry were, however, received from Dr. R. D. Thomson, Dr. Hassall, and Mr. Rainey. These are printed in our Appendix, either entire or in part; and their contents, as well as other facts communicated to us, will be noticed here only so far as they tend to elucidate those questions to which our Memorandum had called attention.

1. The solution of the first question—*Through what channel does the exterior cause or poison of cholera first*

enter or affect the human body? is it through the lungs? or through the stomach and intestines? or otherwise? obviously might be aided by evidence of various kinds; for example—1, by facts showing whether the atmosphere of localities infected by cholera has, or has not, properties favourable to the existence and increase in it of an organic or inorganic poisonous matter; or whether it contains or does not contain some matter of a peculiar character which might be regarded as the poison itself; 2, by evidence of the presence of such peculiar matter in the air-tubes of the lungs; 3, by facts demonstrating, on the other hand, its presence in the water drunk or in other articles of diet; and, 4, by the demonstration of its existence in the stomach and intestines, or in the discharges from them.

Some of the reports laid before us contain information relative to these several points.

(i.) The important observations of Mr. Glaisher, already noticed at length, demonstrate that not only in 1854, but likewise in 1849 and, as far as can now be ascertained, 1832, many conditions of the London atmosphere were such as would favor the retention and increase of any poisonous matter in the air, and that these conditions increased concurrently with the rise of the epidemic, and diminished with its decline. Such facts accord well with the view that the poison of cholera enters the human body through the lungs.

Researches already mentioned, of Dr. Thomson and Mr. Rainey, on the chemical and microscopical qualities of the air, in infected districts and in the immediate vicinity of the sick, have failed to advance knowledge in this particular. As was stated in our last section, they discovered in such atmospheres as they examined no ingredient which, with any plausibility, could be considered special to the prevailing disease.

(ii.) In further search for such possible foreign elements, should they have entered the body by respiration, Mr. Rainey and Dr. Hassall examined microscopically the lining membrane of the air-tubes in persons dead of cholera. Mr. Rainey, having explored the windpipes of eleven persons, as soon as possible after death, "could detect nothing like spores or the mycelia of fungi, or the vibrio-like fibres in any one of them." Dr. Hassall found vibriones abounding in the mucus of the bronchial tubes, but remarks that their presence was probably due to incipient putrefaction.

The general result of these observations, then, is negative in regard to the presence of any peculiar bodies in the air or in the lungs. For, although vibriones were found very abundant in the water through which the air of an hospital ward was passed when it was full of cholera patients, and very few or none when the ward was empty, we have already shown that in these coincidences there is no proof of vibriones having any direct relation with the cause of cholera.

(iii.) That the exterior cause or poison of the disease may enter the human body through the stomach and intestines, has been conceded by many persons who believe they can refer the causation of certain cases to the consumption of foul water, or other putrescent articles of diet; and in our last section we stated the reasons which would lead us to regard such consumption as a probable risk of empoisonment. But, as regards the most possible means of such infection—the water-supply of the metropolis—neither Dr. Thomson by chemical inquiry, nor Dr. Hassall with the microscope, has been able to identify in it any matter, special to the epidemic time or to the infected localities. Indeed (as we have already quoted) the latter observer expressly states that the very various animal and vegetable living products which abounded in the waters of cholera districts belong to species which are well known, and are to be found in the waters of districts not visited by the epidemic; that they have no especial relation with the presence of cholera; and are important only as affording evidence of the impurity of the water.

(iv.) Again, in the intestinal discharges Dr. Hassall has discovered no sporules or threads of any species of fungus, and no peculiar body of any kind, other than vibriones. Vibriones, he states, are constantly present in extraordinary numbers, not only in the matters discharged from the body, but also in the fluids taken after death from the intestines themselves, as high as the duodenum. But these bodies exist in other morbid intestinal discharges, and according to Mr. Rainey, they may be found also in the contents of the intestinal canal after death from other diseases, even when the examination is made at an early period. Their extraordinary number in the rice-water discharges, therefore, probably shows merely a great proneness to decomposition in the fluids poured into the intestines in cholera. It is questionable whether there is any connexion between the presence of vibriones in such vast number

in the intestinal discharges and the fact observed by Dr. Thomson and Mr. Rainey that the same bodies are found in the water through which the air of a cholera ward has been passed. Dr. Hassall states that neither vibriones nor the sporules of fungi rise into the atmosphere through the mere evaporation of the fluid containing them. Yet, as in a cholera ward, portions of the intestinal discharges would certainly be spilled on the floor or on the bed linen and become dry there, vibriones contained in them might in this dried state be disseminated through the air of the ward. We have already stated our suspicion that, when the scope of such examinations is extended, the presence or absence of vibriones in the air, or in the water through which it is filtered, will be found to depend on other circumstances—on the degree of crowding in the ward, and on conditions of ventilation and temperature, which would affect the quantity of organic matter diffused, and the rate of its putrefaction. But all doubt on the matter might be soon solved by parallel examinations of air obtained from rooms equally full of non-infected persons.

In reference to the possibility of infection through the gastro-intestinal membrane, we may here mention an exclusive form in which the doctrine has been urged,—to the effect that this is the only channel through which infection can occur, and that its invariable means consist in the swallowing of matters (chiefly water) specifically contaminated by the fæces of previous choleraic patients. We cannot doubt that drinking-water fouled with excrements, whether diarrhœal or healthy, would represent in a high degree those qualities of organic taint, against which we have already in general terms expressed our opinion. But, while quite prepared to admit the danger of that *class of ingesta* to which such water would belong, we can find nothing in support of the exclusive theory adverted to; and we believe, as already stated, that the geographical distribution of cholera in the metropolis, at each of its three visitations, has in its main features expressed, beyond the possibility of reasonable doubt, that its diffusion chiefly depends on other than dietetic influences.

2. In reply to the second question, "*Has the disease a "period of incubation? if so, how long? and on what is "it contingent?*" Dr. M'Loughlin remarks, that, during the prevalence of the epidemic, all persons who do not actually labour under cholera or diarrhœa suffer from a

slighter disturbance of the stomach and bowels, or from an unusual susceptibility to the action of purgative medicine. Further information is desirable respecting the latter condition, which seems sometimes to be well marked. But the knowledge which the question was chiefly intended to elicit was, whether an interval of definite or indefinite length elapses between exposure to the exterior cause of the disease and the first manifestation of its symptoms.

3. With reference to "*the communication of the disease "from person to person,*" no large body of evidence, either of a positive or of a negative tendency, has been received. In the paper communicated from the Middlesex Hospital, it is stated that in that institution "no disproportionate "liability to the disease has been manifested in those who "have been engaged in attendance on the sick, or engaged "about their dead bodies, or occupied in cleaning their "linen." "One patient and two nurses were attacked "while in the hospital." In St. Thomas's Hospital the staff of "sisters" and "nurses" consists of 19 sisters and 47 nurses. One sister, who had at first the charge of the special wards* for cholera, and four nurses not in attendance in the cholera wards, passed through the different stages into complete collapse. The sister recovered; three of the nurses died.

Mr. Whitfield, the resident medical officer of St. Thomas's Hospital, expresses his disbelief in the communication of the disease from person to person, but says he has seen many remarkable cases of the occurrence of the disease after communication with persons affected at the time or recently. He instances two cases. In one he attributes the attack to the alarm excited in the patient by her being told, when suffering from bilious diarrhœa, that the person in the next bed had had cholera—consecutive fever at the time of admission: the bilious diarrhœa almost immediately became choleraic. The other was the case of a nurse who became very sick and faint while engaged in rinsing out the sheets and linen of a cholera patient, and was attacked with cholera which rapidly proved fatal. The sheets and linen had been left unwashed from the previous day, and Mr. Whitfield believes that this case is an illustration of Professor Liebig's remarks, and that the nurse "imbibed

* It may be remarked that these wards are the least favourably placed parts of St. Thomas' hospital, and that the hospital itself stands in the middle of a district where cholera has always prevailed with peculiar severity.

" the poison, not by communication with the person, but " from the decomposed secretion."

We have already referred to a speculation, so far as it relates to the human subject, that all diffusion of cholera depends on a deglutition of some amount of choleraic fæces, conveyed from the sick to the healthy in various articles of food, and especially in water. Professor Liebig had stated as the result of experiments, that the rice-water discharges acquired at a certain stage of putrefaction the property of inducing a disease similar to cholera, in animals to which they were administered. Dr. Thomson communicates the particulars of an experiment of this kind, instituted by himself. The result was negative. But Dr. Thomson does not regard this single observation as conclusive. Moreover, it cannot be expected that the question will be settled in this way. There is no sufficient ground for thinking that the lower animals are susceptible of epidemic cholera; and the fact of diarrhœa being produced in them by such experiments as those of Liebig, would merely prove that the discharges, when putrescent, are noxious, not that they contain the particular poison by which cholera is generated in the human subject.

Some microscopic observations of Dr. Hassall on the clothes of cholera patients have an indirect bearing on the question of the mode of diffusion of cholera. For, even though the cause of cholera be not an emanation from the bodies of the sick, if it be a matter which increases in foul air, it may possibly be conveyed in the clothes of men from one locality to another. Dr. Hassall found, as was to be expected, that animal matters in which living organic products were visible could sometimes be extracted from the clothes of cholera patients; but he found no peculiar organic body. Sporules of fungi were very rare, and vibriones were abundant only in clothes which were stained with rice-water discharges.

4. The seventh question suggested was, " *Does cholera* " *begin as a morbid process of the gastro-intestinal mucous* " *membrane, or is this preceded by some state of general* " *poisoning which requires the gastro-intestinal membrane* " *to act as an emunctory? Is the state of collapse deter-* " *mined by this gastro-intestinal flux, and in proportion to* " *it, or can it arise independently of any such flux? How* " *are the lividity and the cramps determined and propor-* " *tioned?*

To the first two clauses of this question no direct answer has been received by us; yet they are of very high importance. The flux from the gastro-intestinal mucous membrane is, doubtless, the first of the more obvious phenomena of the disease, and may perhaps be in every sense its beginning; but, on the other hand, it may be that the cause of cholera affects primarily some other part of the economy, as the blood or the nervous system, and acts only through them upon the mucous membrane of the stomach and intestines; and it may be that the affection of this membrane is essentially the process by which some poison is eliminated from the body. Both views have been asserted by writers on the disease; and as they almost necessarily lead to opposite methods of treatment, it was thought desirable by this question to invite closer examination of the point.

With respect to the next clause of the seventh question, —"*Is the state of collapse determined by the "gastro-intestinal flux, and in proportion to it, or can it "arise independently of such flux?*" Some relevant information is found in the returns of cases of diarrhœa and cholera treated during the late epidemic. The number of cases of collapse reported is 1,798, and in all but six cases the collapse was preceded by one or more of the earlier stages of the disease, which are attended by intestinal discharges. More accurate inquiry would most probably have elicited the fact, that even in the six exceptional cases some intestinal flux occurred before the phenomena of collapse were developed. In some or all of the six cases the amount of liquid matter discharged may have been inadequate to account for the collapse, but, even then, there may have been poured out from the blood a large quantity of fluid which still remained in the intestines. The following is an extract from the report received from the Middlesex Hospital:—"A child about "3½ years of age was admitted in a state of complete "collapse, having had only one motion and having vomited "but slightly since the commencement of the disease. In "this, as in many similar instances, it may be asserted, "that the flux had already taken place into the bowel, "but had not been discharged *per anum*, for soon after "admission the child was profusely purged."

In the Middlesex Hospital report, it is stated that although in general the severity of the collapse was in proportion to the amount of discharges, it was not so in

all cases. This is in accordance with previous experience, but it needs to be determined by further observation, whether the differences in amount of the discharges producing a given effect, and the differences in effect resulting from discharges of given amount, can be referred to diversities in age, in nervous power, in tendency to syncope, in the quantity of the fluid in the body, or in other like conditions of the individual patients.

5. The eighth group of questions related to the pathology of the *consecutive fever;* and the two questions "*To what* "*extent does it depend on the previous occurrence of* "*profuse discharges? or on the completeness of collapse?* "*Does stupor in this stage always depend on uræmia? or* "*on what?*" are in some measure elucidated, or at least touched upon in the papers before us. The tabular returns of cases of diarrhœa and cholera having been drawn up for the most part after the cessation of the epidemic, of course could not be referred to with confidence for the settlement of questions relative to minute points of pathology. But there is no reason to doubt the trustworthiness of the information of a general character which they afford in regard to the connexion between consecutive fever and collapse. 874 cases of consecutive fever are reported, 249 fatal, and 625 recovered from. In all the cases the fever stage was preceded by cholera; but the presence or absence of collapse is mentioned in only 808 cases; and in 223 cases of this number, or 27·6 per cent., the cholera had not passed into collapse. Here, then, it appears that the occurrence of consecutive fever is not closely dependent on preceding collapse. But the result is very different when the 225 fatal cases, included among the 808 cases above mentioned, are examined separately: for, of these, 199 were preceded by collapse, and only 26, or not quite 11·15 per cent., by cholera without collapse; so that the severer forms of the morbid states included under the term consecutive fever, seem to be in a very large majority of cases connected with a preceding condition of collapse.

These deductions from the tabular returns are entirely consistent with the results obtained at the Middlesex Hospital, as they are stated in the subjoined conclusions extracted from the report from that institution:

(*a.*) "Nearly all those cases in which collapse was "complete and purging profuse, fell into a greater or "less degree of consecutive fever."

(*b.*) "Many cases passed into the most extreme stage "of collapse, and yet, after remaining in that condition "for many hours, recovered with the slightest degree "of consecutive fever."

(*c.*) "Of those cases which did not pass into a state "of complete collapse, several were followed by a slight "and two by a severe form of consecutive fever."

(*d.*) "All the cases of severe fever, with the two "exceptions above mentioned, were preceded by severe "collapse and considerable discharges."

(*e.*) "The degree of fever appears to have borne some "relation to the duration of the stage of collapse; there "are, however, numerous exceptions to this rule."

With reference to the question—"*Does stupor in this stage* (*consecutive fever*) *always depend on uræmia? or on what?*" the following remarks occur in the Middlesex Hospital report:

"Of the cases which died in a state of coma, with one "exception, all had suppression of urine; and in the ex- "ceptional case the quantity of urine was diminished."

"Case 39, fell into a state of complete coma from which "he appeared sinking. After remaining in this condition "for more than 24 hours he recovered. Throughout all "this stage urine was passed copiously, and of good "specific gravity. And although the urine contained "a trace of albumen (as was the case with most cholera "patients), there did not appear to be any reason for con- "sidering that uræmia was present. The coma much "more resembled that seen in typhus."

6. The import, tendency, and characters of the diarrhœa, which prevails epidemically together with cholera, formed the subject of the ninth group of questions.

(i.) "*When diarrhœa and cholera prevail together epidemically are they* (*with differences of degree*) *the same disease?*"—This question must now, doubtless, be answered affirmatively. The larger part at least of the diarrhœa which is generally so rife in localities where cholera exists, must be ascribed to the same cause and must be regarded as only a slight degree of the diseased action which in a higher degree becomes cholera. But if diarrhœa when aggravated is cholera, how comes it that so many deaths are during a cholera epidemic registered as caused by diarrhœa? During the 18 months from July 1853 to December 1854, 11,661 deaths from cholera were registered in London, and as many as 6,258 deaths from

diarrhœa. Making an ample deduction from this number on the score of the deaths from bowel complaints of various forms which occur annually when cholera does not prevail, there remain 4,000 deaths referable to the epidemic and registered as due to diarrhœa. How did these 4,000 cases differ from the 11,661 cholera deaths? That many of them presented distinctive features cannot be doubted. In the first place the average duration of the 4,150 cases of fatal diarrhœa registered was 13 days; so that a large portion of them must have been cases in which the disease ran a slow course; and, in the second place, children and old persons above the age of 65 furnished a large majority of them. Now there are fatal cases of the disease in which the lividity of the surface and the cramps are either very little marked or are absent, and these cases are observed chiefly in children and old persons, and are often of a lingering character. They, therefore, in all probability, form a part of the cases which appear in the register of deaths as fatal cases of diarrhœa. In the hospitals of London few deaths were attributed to diarrhœa, only 42, while the deaths attributed to cholera were 800. In workhouses, on the contrary, 400 deaths from diarrhœa were registered, with 924 deaths from cholera. This difference is in part explicable by the small proportion of children and old perrons among the patients admitted into the general hospitals, and the large proportions of persons of those periods of life among the inmates of workhouses. Again in the districts on the higher levels the registered mortality from diarrhœa was in proportion to the registered mortality from cholera far greater than it was in the districts on the lower levels. And this may in part be explained on the assumption that in the higher districts where the epidemic cause was not generally in strong action, the fatal cases would often be less intense in character and less rapid in their course. These cannot, however, be accepted as the sole reasons of the predominance of diarrhœa amongst the deaths from the epidemic in the higher districts of London and of the small proportion it forms amongst the deaths in the hospitals. For in some of the hospitals where the deaths from cholera were numerous, no deaths from diarrhœa were registered, and in some of the sub-districts of London which have not a high level and which suffered severely from the epidemic, the deaths from diarrhœa exceeded in number the deaths from cholera. The truth probably is that the choice of

the term used in registering the deaths was often made somewhat arbitrarily; that in private practice, especially in districts where the disease was not very rife, there was a disposition to give the less formidable name of "diarrhœa" even to cases which had the features of cholera distinctly marked; whilst in hospitals, a more strictly pathological view of the matter being taken, all, or nearly all, the fatal cases were denominated deaths from cholera.

The deaths registered, as caused by diarrhœa, so far as they were due to the epidemic cause, were, then, cases of cholera more or less modified in their features, and had no closer relation with the ordinary cases of diarrhœa which were not fatal than the deaths registered as "cholera deaths" had; for both classes of deaths were alike the results of the same morbid process which in its slightest degree was the "simple diarrhœa."

(ii.) On the mutual relation of these two grades of the epidemic influence, we have received a communication from Dr. M'Loughlin, who is known to have devoted much time and labour to the inquiry. He strives chiefly to prove that cholera is *always* preceded for a certain time, some hours, some days, or some weeks, by a "premonitory diarrhœa;" and he does not admit the occurrence of exceptional cases. It may be doubted whether the single profuse discharge which in a few cases precedes for an hour or little more the state of developed cholera, can be regarded as constituting *premonitory* diarrhœa. But it cannot be disputed that these cases are very rare, and that cholera is in the vast majority of cases preceded by a stage of diarrhœa which affords time for treatment.

(iii.) No evidence has been laid before us which might aid to solve the question, "*Does the diarrhœa, if left to "itself, generally and safely tend to spontaneous recovery; "or do such cases, without medical treatment, frequently in "proportion to their numbers, pass into true cholera?*" And it will always be difficult to obtain satisfactory evidence with regard to this question.

For although the number of cases of cholera which were neglected in the stage of diarrhœa may be learned with accuracy, it will be scarcely possible to ascertain the number of cases of diarrhœa in the same town or district which terminate by recovery in that stage although not brought under medical treatment. The small proportion of the cases of diarrhœa which pass into cholera when remedial means are employed is shown in the "Report on

the Results of the different Methods of Treatment pursued in Epidemic Cholera."

7. No new *chemical analysis of the blood* in cholera has been communicated to the Medical Council. But as the changes which the composition of the blood undergoes necessarily bear a close relation to the composition of the fluids poured out from the blood-vessels into the intestinal canal, reference may here be made to the Report of Dr. R. D. Thomson (App. No. X.) on "the Chemistry of the Rice-water Excretions."

Some observations on the physical and microscopical characters of the blood after death from cholera will be found in Mr. Callender's minute account (App. No. XIII.) of twelve autopsies made at St. Bartholomew's Hospital. Remarks by Dr. Hassall on the same subject, and on the state of the urine in cholera, are likewise contained in our Appendix (No. XI.)

In any future visitation of cholera, more extensive and systematic inquiries, it is to be hoped, will be instituted relative to the pathology of the disease; and in order that these inquiries should produce large results, it is most desirable that they should be commenced at an early period of the epidemic. On this account (*see* p. 127) we append to our Report the Pathological Memorandum, which elicited the various answers discussed in our present section; and which may at least serve to remind pathological inquirers at a future period of the position at which our knowledge had arrived at the time of the last epidemic, and of the directions in which its advance was then felt to be most needed.

In closing our present Report, and therewith terminating our labours as a committee for scientific inquiries in relation to the late epidemic, we would venture respectfully to suggest, with a view to future emergencies of the kind, that if such inquiries are to be fruitful of result, they should to some extent be continued in the absence of the disease which they aim at elucidating.

Just as there can exist no science of morbid anatomy, till the structure of the healthy body be first well learnt; just as there can be no medical knowledge of what makes a symptom of disease, till physiology have first established a standard of natural function; so it is, we believe, with

the studies which, in their future development, may perhaps explain the birth of epidemic disease.

The preparatory steps of such studies are even yet scarcely made. In attempts to elucidate the exact nature of those processes by which epidemic poisons are generated, almost insuperable difficulties have been found; not from want of apprehension as to what the factors may be in such exceptional generation of poison, but from lack of definite knowledge as to the normal working of these factors.

It seems certain that in the chemistry of organic decomposition there is concealed a large share of the mystery we would solve; and it is impossible yet to say, how much of the remainder may belong to undeveloped branches of meteorological science.

Under any future epidemic invasion which our country may unhappily suffer, it is in these departments of natural science that temporary and exceptional phenomena will claim renewed investigation; and we hope we do not outstep a proper fulfilment of the trust reposed in us, when we suggest, that in this intervening time are comprised golden opportunities for rendering probable the success of investigations then to be undertaken,—opportunities for making effective progress in the preliminary studies to which we advert, and for establishing a better normal standard than is yet discovered, to measure the chemical and meteorological anomalies of an epidemic period.

We have the honor to be, Sir,

Your obedient humble Servants,

N. Arnott.
William Baly.
William Farr.
Rich^{D} Owen.
John Simon.

SUPPLEMENT TO THE REPORT

OF THE

COMMITTEE FOR SCIENTIFIC INQUIRIES.

No. I.

THE following is the letter circulated among Members of the Medical Profession by the General Board of Health in September 1854:—

Letter addressed by the President of the General Board of Health to Medical Practitioners.

General Board of Health, Whitehall,
SIR, September 1854.

MY experience of this Department, brief as it is, has strongly impressed me with a sense of the great want that is now felt of some systematic record of cases of choleraic disease, their treatment, and results, with a view to determine, in so far as may be possible, the best mode of meeting this formidable epidemic.

Hitherto no successful attempt has been made to collect such a record; and as I find that my feeling of the want of it is very generally shared by the medical profession, I have obtained the sanction of Her Majesty's Government to the nomination of a Medical Council, representing all branches of the profession, and consisting of Dr. Paris, Sir James Clark, Dr. Alderson, Dr. Babington, Dr. Tweedie, Dr. Baly, Mr. Lawrence, Mr. Simon, Professor Owen, Mr. W. B. Ward, Mr. John Bacot, and Dr. Farr.

Under the sanction of this Council the following form of return has been prepared for transmission to all qualified practitioners in the metropolis, to be filled up by them, with a view to obtain their experience of the present epidemic.

The deaths from cholera, as well as from all other causes, are registered in England; but it is evidently desirable that in this as in other countries the cases of recovery, as well as of death, should be systematically observed and recorded. But this can only be accomplished by the cordial co-operation of all the medical men in practice, which the Board hopes, in this important matter, to obtain, by acting on the advice of a Council in which all branches of the medical profession are represented.

By means of a return, in the accompanying forms, the observations of all qualified practitioners on the cases that come under their care may be collected, and made available for determining the laws which regulate choleraic disease, and the effects of the different systems of treatment now in use.

Any return that you may make will be considered strictly confidential, but your name will be recorded as a contributor to the observations, when the general results are made known.

Under the urgent pressure of practice, to keep any accurate record of the cases will often be attended with difficulty; but this difficulty will, I feel assured, be cheerfully encountered by you if you agree with me in thinking a record of the experience of the present generation of medical men as to this epidemic likely to contribute to the alleviation of the sufferings of mankind for the future.

The return on the other side is sent filled up, as a specimen, with blank forms. Any number of such forms you may require will be furnished by this office.

It is recommended that the forms should be filled up from day to day, and returned to the Board, on or before the 15th November next, addressed to the Secretary of the General Board of Health, and the postage of the letter enclosing the return need not be prepaid.

I have the honour to remain, &c.

B. HALL.

NOTE.

THE foregoing letter was sent by the General Board of Health to all practitioners whose names appear in the "Medical Directory" of the year 1854.

In pursuance of the promise therein contained, the names of all who contributed returns are now recorded.

Among the names occur some of homœopathic practitioners, from whom returns were received; but the Committee for Scientific Inquiries desire it to be understood that none of these communications have been used in the construction of their Report.

List of legally-qualified Medical Practitioners, Medical Officers of Hospitals, &c., in England, Scotland, and Wales, who have furnished Returns of Cases of Cholera and Diarrhœa to the General Board of Health.

(*See* the President's Letter, p. 67.)

Name.	Address.
Anderson, John, M.R.C.S. & L.S.A.	4, Bedford Terrace, Clapham Rise.
Air, Alex. Cummings, M.R.C.S. -	15, Studley Terrace, Stockwell.
Alexander, Wm., M.D. -	Dundonald, by Kilmarnock, N.B.
Aspray, Thomas, L.S.A. - -	12, Wilmington Square.
Adcock, Christr., L.S.A. - -	8, Great Charlotte Street, Blackfriars Road.
Alford, S. S., M.R.C.S. & L.S.A. -	7, Powis Place, Haverstock Hill.
Allen, A., M.R.C.S. - - - -	18, Hunter Street, Brunswick Sq.
Arden, H. A., M.R.C.S. & L.S.A.	High Street, Dorchester.
Appleton, H., M.D. Aberdeen, M.R.C.S. & L.S.A.	Mare Street, Hackney.
Ayres, Philip B., M.D. Lond., & M.R.C.S.	6, Upper Portland Place, Wandsworth Road.
Aitkin, James, M.R.C.S. - -	Ceres, N.B.
Allen, Geo., L.S.A. - - -	14 a, Dean Street, Soho.
Aldis, C. J. B., M.D. - - -	1, Chester Terrace, Pimlico.
Angers, V. P. de Bois, M.D. Heidelberg, M.R.C.S.	2, Salamanca Cottages, Upper Church Street, Queen's Elm.
Armstrong, Thos., M.R.C.S. & L.S.A.	Brecon, S.W.
Baines, Matthew, M.D. Lond. -	54, Thurloe Square, Kensington.
Burroughs, J. T. R., M.R.C.S. -	3, Lee Place, Lee.
Bunnett, H. B., M.R.C.S. - -	5, Carlton Hill East, St. John's Wood.
Bowling, John, M.R.C.S. - -	Pingsworth House, Hammersmith.
Barnwell, Wm., M.R.C.S. & L.S.A.	7, Queen Charlotte Row, New Road.
Barnwell, W. H., M.R.C.S. -	Ditto ditto.
Bainbridge, J. N., M.D. St. And., F.R.C.S. & L.S.A.	86, St. Martin's Lane.
Bainbridge, Wm., M.R.C.S. & L.S.A.	17, Upper Eaton Street, Pimlico.
Balding, D. B., M.R.C.S & L.S.A.	St. Mary-le-bone Infirmary.
Barringer, T. S., M.R.C.S. & L.S.A.	96, St. John Street, Clerkenwell.
Brodribb, W. P., M.R.C.S. & M.S.A.	9, Bloomsbury Square.
Bennett, J. M., M.R.C.S. - -	46, Upper Baker Street.
Bradley, R. H., M.R.C.S. & L.S.A.	Trafalgar Road, Greenwich.
Bibby, Sam. H., M.R C.S. & L.S.A.	9, North Audley Street.
Bowra, H. G., M.R.C.S. & L.S.A. -	Brooke Lodge, De Beauvoir Road, Kingsland.
Bryant, John, M.D. Ellangen -	Colebrooke Villa, Finchley.

Name.	Address.
Besemeres, Wm., M.R.C.S. & L.S.A.	13, Marlborough Place, Old Kent Road.
Balfour, G. W., M.D. - - -	Westfield, Cramond, N.B.
Bradshaw, H., M.R.C.S. - -	1, St. James's Road, Liverpool.
Buchanan, G. A., M.R.C.S -	11, Middleton Square, Clerkenwell.
Bonney, F.A.B., L.R.C.S. & L.S.A.	3, Trevor Terrace, Knightsbridge.
Beale, John Sam, M.R.C.S. -	87, Harrow Road.
Bullock, Henry, M.R.C.S. & L.S.A.	15, Cumberland Street, Bryanston Square.
Bianchi, Robt., M.R.C.S. & L.S.A.	8, Great Surrey Street, Blackfriars.
Brent, Robt., M.R.C.S. - -	Sydney Cottage, Woodbury, near Exeter.
Blackmore, J. T., L.S.A. - -	24, Old Street Road.
Bossy, A. H., L.S.A. - - -	Nelson Terrace, Stoke Newington.
Blundell, John, M.R.C.S. & L.S.A.	St. Helen's, Lancaster.
Clarke, John, M.D. - - -	42, Hertford Street, Mayfair.
Campbell, Wm., M.R.C.S. - -	New Street, Kilbarchan, N.B.
Christian, J. Stanley, M.D. -	1, Ovington Terrace, Brompton.
Carter, Wm. G., M.R.C.S. -	1, Manchester Terrace, Kilburn.
Cheyne, R. R., F.R.C.S. & L.S.A.	43, Berners Street.
Clifton, Nath. H., M.R.C.S. -	38, Cross Street, Islington.
Covey, W. H., F.R.C.S. - -	23, Wilton Street, Grosvenor Sq.
Chepmell, E. C., M.D. Edin. -	22, Henrietta Street, Cavendish Sq.
Corner, Mat., M.D., M.R.C.S. & L.S.A.	40, Colet Place, Commercial Road.
Cargow, Chas., M.R.C.S. - -	Dalrymple, Girvan, Ayr, N.B.
Cresswell, John, M.R.C.S. & L.S.A.	Winchmore Hill.
Collambell, Charles, F.R.C.S. & L.S.A.	15, Lambeth Terrace, Lambeth.
Currie, Alex., M.D. - - -	Bowmore, Islay, N.B.
Currie, J. T., L.F.P. & S.G. -	10, Norfolk Street, Fitzroy Square.
Clark, Chas., M.R.C.S. - -	Adelaide Terrace, Notting Hill.
Cameron, Angus, M.D. & L.R.C.S.	Balfron, by Glasgow, N.B.
Cox, Harry, M.R.C.S. & L.S.A. -	23, Hill Street, Camberwell.
Cooper, J. P., M.R.C.S. & L.S.A. -	Bow Road.
Cunningham, W. J. M., L.S.A. -	Hoo, Kent.
Catherwood, Alfred, M.D. Glas. & L.S.A.	21, Charles Square, Hoxton.
Corrie, J., M.D., M.R.C.S. & L.S.A.	Finchley.
Capes, G.A. H., M.R.C.S. & L.S.A.	22, Philpot Lane.
Cowan, Jno. B., M.D. - -	West Regent Street, Glasgow, N.B.
Collinson, Alfred, M.R.C.S. -	81, Connaught Terrace, Paddington.
Cumming, W. S., M.R.C.S. & L.S.A.	2, Vittoria Place, Limehouse.
Christophers, J. C., M.R.C.S. -	38, York Street, Portman Square.
Challice, John, M.D. Aberd. & L.S.A.	40, Grange Road, Bermondsey.

Name.	Address.
Chesterman, S., M.R.C.S. & L.S.A.	Banbury.
Colgate, Robt., M.R.C.S. & L.S.A.	Eastbourne, Sussex.
Dale, G. Cornelius, M.R.C.S. & L.S.A.	Commercial Road, St. George's East.
Davis, Robt., M.D., M.R.C.S. & L.S.A.	2, Brunswick Place, City Road.
Davis, H. P., M.R.C.S. & L.S.A.	71, Oakley Square, St. Pancras.
Dickman, David, L.R.C.S. -	14, Porchester Place.
Druitt, Robt., M.D. - - -	39a, Curzon Street, Mayfair.
Davis, E., M.R.C.S. & L.S.A. -	17, Upper Belgrave Place, Pimlico.
Davidson, N., L.S.A. - -	15, Charles Street, Manchester Sq.
Dean, J. H., M.R.C.S. - -	32, Lucas Street, Commercial Road.
Duncan, Jas., M.B. & M.R.C.S. -	18, Henrietta Street, Covent Garden.
Dickson, John, M.R.C.S. - -	High Street, Bathgate, N.B.
Duchesne, Clarke, M.R.C.S. & L.S.A.	22, White Lion Street, Norton Folgate.
Devenish, S. W., M.B., M.R.C.S., & L.S.A.	7, Billiter Square.
Dixon, John, M.D., M.R.C.S., & L.S.A.	20, Prospect Row, Bermondsey.
Dickson, James, M.R.C.S. - -	Roberton-by-Abington, Lanark, N.B.
Dodsworth, F. C., M.R.C.S. -	Turnham Green.
Dickinson, Thos., M.R.C.S. & L.S.A.	37, Sloane Street, Chelsea.
Douglas, Joseph, M.R.C.S. - -	1, Sumner Terrace, Brompton.
Dale, Edmund, M.D. St. And., L.S.A.	23, Holborn Hill.
Dupasquier, C. J., M.R.C.S. & M.S.A.	62, Pall Mall.
De Meric, Victor, M.R.C.S. -	17, Brook Street, Grosvenor Sq.
Down, Geo., M.R.C.S. & L.S.A. -	4, Upwell Place, Camberwell New Road.
Davies, John, M.R.C.S. & L.S.A.	Bulwark, St. Mary's Brecon.
English, Thomas, M.D. St. And., M.R.C.S. & L.S.A.	32, Upper East Smithfield.
Ellis, H. W. T., M.R.C.S. - -	Crowle, Lincolnshire.
Edwardes, David, L.S.A. - -	13, Great Russell Street, Covent Garden.
Engall, Thos., M.R.C.S. - -	15, Euston Square.
Eve, Richd. Wafford, M.B. & L.S.A.	7, Slade's Place, High Street, Deptford.
Ellis, Cydwelyn, M.D. St. And., M.R.C.S. & L.S.A.	31, Howland Street, Fitzroy Square.
Edmonds, J. W., L.S.A. - -	Montague Cottage, Southampton Street, Camberwell.
Fowler, Robt., M.D. Edinburgh, M.R.C.S. & L.S.A.	145, Bishopsgate Street Without.

Name.	Address.
Forman, John, M.R.C.S. - -	Fettercairn, N.B.
Forbes, J. G., F.R.C.S. & L.S.A.	9, Devonport Street, Paddington.
Faulker, Wm., M.R.C.S. - -	151, Drury Lane.
Fuller, Hy. Wm., M.D. - -	13, Manchester Square.
Ferguson, Jno., M.R.C.S. - -	Cove-Nigg, N.B.
Farrants, R. J., F.R.C.S. & L.S.A.	5, Regent Terrace, City Road.
Fotherby, H. I., M.B., M.R.C.S., & L.S.A.	40, Trinity Square, Tower Hill.
Gibb, Geo. D., M.D. Montreal, & L.R.C.S.I.	59, Guildford Street, Russell Square.
Giles, Wm., M.R.C.S. - -	1, Canton Place, East India Dock Road, Limehouse.
Grant, Thos. Walker, M.D. Aber., M.R.C.S. & L.S.A.	9, Connaught Terrace.
Gibson, J. B., M.R.C.S. & L.S.A.	3, Spring Place, Bagnigge Wells Road.
Griffith, Samuel Hallett, M.R.C.S. & L.S.A.	2, Charterhouse Square.
Grimbly, Richard, M.R.C.S. & L.S.A.	South Bar, Banbury.
Goodworth, W. H., L.S.A. - -	Hatfield, Yorkshire.
Gibson, J. R., M.R.C.S. & L.S.A. - -	115, Holborn Hill.
Grant, Nathl., M.D. Edinburgh, M.R.C.S.	48, York Street, Portman Square.
Graham, Thomas, M.R.C.S. & L.S.A.	2, Oxford Terrace, Upper Holloway
Goodday, Horatio, M.R.C.S. & L.S.A.	48, Baker Street, Portman Square.
Graham, John, M.R.C.S. - -	Stanley, Perth, N.B.
Goddard, Saml., M.R.C.S. - -	Swan Square, Burslem.
Greenwood, Thos. B., L.S.A. -	1, Horsleydown Lane, Southwark.
Horton, Fitzwilliam, L.S.A. -	Glo'ster Lodge, North End, Fulham.
Halford, Edw., M.R.C.S. & L.S.A.	The Grove, Hammersmith.
Hart, W. B., M.R.C.S & L.S.A. -	15, Union Street East, Spitalfields.
Harper, James P., M.D. - -	53, Constitution Street, Leith, N.B.
Halley, Alexr., M.D. - - -	14, Queen Anne Street, Cavendish Square.
Hadaway, James, M.R.C.S. & L.S.A.	36, Berwick Street.
Hammond, H. S., M.R.C.S.	Church Street, Edmonton.
Hunter, John, M.R.C.S. - -	115, Upper Street, Islington.
Hall, D. J., M.D., Edin. - -	South Street, Eastbourne, Sussex.
Haffenden, Thos, M.R.C.S. -	Hanwell.
Harris, H. C., F.R.C.S. & L.S.A. -	1, Windsor Place, City Road.
Harper, Robert, M.R.C.S. & L.S.A.	7, Westbourne Place, Paddington.
Hawkins, James, M.R.C.S. -	36, Colet Place, Commercial Road.

Name.	Address.
Hicks, J. B., M.D., M.R.C.S., & L.S.A.	High Road, Tottenham.
Haycock, Edwd., M.R.C.S. & L.S.A.	25, Gretton Terrace, Green Street, Bethnal Green.
Hunter, Jas., F.R.C.S. - -	115, Upper Street, Islington.
Humble, W. E., M.D. Lond. -	66, London Road, Southwark.
Halford, Edwd., M.R.C.S. & L.S.A.	1, City Road.
Harle, Ezra, L.S.A. - - -	48, Cross Street, Islington.
Hensley, F. J., M.D. London, M.R.C.S. & L.S.A. - - -	30, Montague Place, Russell Square.
Hughes, H. W., M.R.C.S. - -	138, Fenchurch Street.
Hunt, Joseph, M.R.C.S. - -	82, Gray's Inn Lane.
Hicks, E. J., L.S.A. - - -	Havant, Hants.
Hall, Wm., M.R.C.S. & L.S.A. -	High Street, Tottenham.
Harling, R. D., M.D. London -	9, Upper Seymour Street, Portman Square.
Harness, H., M.R.C.S. - -	1, Kimbolton Place, Fulham Road.
Hull, Geo., M.D. - - -	1, St. Mary Abbot's Terrace, Kensington.
Hering, Wm., L.S.A. - -	38, Mortimer Street, Cavendish Sq.
Harrison, John, F.R.C.S. - -	Abany, Piccadilly.
Harris, W., F.R.C.S. - - -	16, Dorset Terrace, Clapham Road.
Hutchinson, Jno., M.R.C.S. & L.S.A.	184, Blackfriars Road.
Hudson, Jno., M.D. & M.R.C.S. -	11, Cork Street, Burlington Gardens.
Ingram, Chas., M.R.C.S. & L.S.A.	White Mill, Blandford.
Jefferys, Wm. Edw., M.R.C.S. -	2, St. Augustine's Road, St. Pancras.
Jones, J., M.R.C.S. - - -	5, Seymour Place, Wandsworth Road.
James, W. Reynolds, M.R.C.S. & L.S.A.	68, Milton Street, Dorset Square.
Joseph, Edwd., M.R.C.S. & L.S.A.	15, Great Marylebone Street.
Jones, Jno. Dalston, M.D. Aber., & M.R.C.S.	Queen's Road, Dalston.
Jeanneret, Hy., M.D. Edinburgh, L.R.C.S. & L.S.A.	15, Upper George St., Marylebone.
Jones, Wm., M.R.C.S. - -	51, Strand.
Illingworth, Hy. S., F.R.C.S. & L.S.A.	1, Arlington Street, Piccadilly.
Jones, Walter, M.R.C.S. - -	27, Fetter Lane, Fleet Street.
Jeffery, G. A., M.R.C.S. & L.S.A.	Trinity House, Eastbourne, Sussex.
Kingdon, J. A., M.R.C.S. - -	2, Bank Buildings, Lothbury.
Kesteven, W. B., M.R.C.S. -	1, Manor Road, Upper Holloway.
Kellock, W. B., M.R.C.S. - -	Stamford Hill.
Knott, Jas. P., L.S.A. - - -	Grafton Villa, Blisworth, Northampton.

Name.	Address.
Kirk, J. B, M.D. - - -	Bathgate, Linlithgow, N.B.
Kenny, Josh., M.B & L.S.A. -	High Street, Stoke Newington.
Knaggs, Robt., M.R.C.S. & L.S.A.	Swindon.
Lovett, Saml., M.R.C.S. & L.S.A.	23, Clare Street, Clare Market.
Lewis, Waller, M.B. Cantab. -	56, Gower Street, Bedford Square.
Leggatt, Richard S., M.R.C.S & L.S.A.	Eastry, near Sandwich.
Lloyd, Thomas, F.R.C.S - -	5, New Basinghall Street.
Lyell, John, M.D. - - -	Main Street, Newburgh, Fifeshire, N.B.
Littlewood, Jo J., M.R.C.S. & L.S.A.	2, Stonegate Street, Thorne.
Lord, C. F. J., M.R.C.S. - -	Hampstead.
Leese, R. V., M.R.C.S. & L.S.A. -	Norwood.
Littler, Jno. W., M.R.C.S. & L.S.A.	Lower Edmonton.
Leggatt, Alfred, M.R.C.S. & L.S.A.	13, William Street, Lowndes Sq.
Leigh, Wm. Osborne, L.S.A. -	High Street, Deptford.
Lyddon, Jas., M.R.C.S & L.S.A. -	Okehampton, St. Thomas, Exeter.
Land, W. H., M.R.C.S. & L.S.A. -	Strand Street, Exmouth.
Leonard, Jas., M.R.C.S. & L.S.A -	2, Salisbury Street, Strand.
Little, W. J., M.D. - - -	34, Brook Street, Havover Square.
Langley, John, L.S.A. - -	48, Upper Albany St., Regent's Park.
Lane, W. R. F., M.R.C.S. & L.S.A.	2, North Side, Bethnal Green.
Mitchell, Thos. H., M.R.C.S. & L.S.A.	2, Francis Place, Holloway.
Morris, Jas., M.B. Lond. & F.R.C.S.	79, Park Street, Grosvenor Square.
Mould, J. T., M.R.C.S. & L.S.A. -	1, Onslow Crescent, Brompton.
Moss, Edwin, M.R.C.S. - -	71, Wimpole Street.
Meates, W. C., M.R.C.S. - -	41, Chester Square.
Miles, Chas., M.R.C.S. & L.S.A. -	13, Conduit St., West, Hyde Park.
M'Donald, Wm., M.R.C.S. -	Muirhead Cottage, Cadder, N.B.
Mathew, Jas. Edwd., M.R.C.S. & L.S.A.	54, Conduit Street, Hanover Sq.
Mackie, Archibald, M.D. - -	Cupar, Fife, N. B.
Macfarlane, D., M.D. - -	Drymen, Stirlingshire, N. B.
Munday, Chas., M.R.C.S. - -	86, Snow Hill.
Morgan, John, F.R.C.S. - -	5, Albion Place, Hyde Park Square.
Meldola, Eleazar, M.D. Giessen, L.S.A.	6, Great Alie Street.
Molloy, Robt., M.D. Aberdeen, M.R.C.S. & L.S.A.	57, Amwell Street, Claremont Square, Clerkenwell.
Malton, Chas. J., F.R.C.S. -	6, Stanhope Place, Hyde Park.
Mageniss, Peter, M.R.C.S. - -	18, Hamilton Place, New Road.
Mitchelson, G. F., M.D. Aber., M.R.C.S. & L.S.A.	11, Ashley Place, Victoria Street, Westminster.
Mackintosh, James Innis, M.D., Edin., L.R.C.S.	St. Olaves Infirmary.

Name.	Address.
McWilliam, J. O., M.D. Edin. -	14, Trinity Square, Tower Hill.
Matheson, L. M., M.R.C.S. -	Portree, Isle of Skye, N.B.
Madden, Jas. M., L.R.C.S. Dub.	Heavitree.
Merry, Wm. H., M.R.C.S. & L.S.A.	Broad Clyst, Exeter.
Maçtavish, Colin, M.R.C.S. -	Springbank, Islay, N.B.
Nind, Chas., M.R.C.S. & L.S.A. -	13, Bath Place, Peckham.
Nix, Wm., L.S.A. - - -	11, Savile Row, Mile End Road.
Owen, Harvey K., M.R.C.S.	4, Binfield Place, Clapham Road.
Oliver, Jno. Robt., M.D. - -	28, Harleyford Place, Kennington.
Orr, R. S., M.D. - - -	George Terrace, Dunoon, Argyleshire, N.B.
O'Shea, Michael Keating, M.R.C.S.	17, Mount Street, Lambeth.
Payne, G. B., M.D. Aber., L.S.A.	58, Denbigh Street, Warwick Square, Pimlico.
Paton James, M.D. - - -	Orr Square, Paisley, N.B.
Palmer, Thomas, M.B., M.R.C.S. & L.S.A. - - - - -	16, Upper Southwick Street, Hyde Park.
Pitman, Henry A., M.D. - -	Montague Place.
Pollock, Robt. Jas., F.R.C.S. & L.S.A.	7, Bath Place, Kensington.
Pullan, Richd., M.R.C.S. - -	Epworth, Bawtry.
Patison, H. W., M.R.C.S. - -	Hirst Street, Renfrew.
Pottle, J. R., L.S.A. - - -	20, Bath Street, St. Luke's.
Parratt, Jas., M.D. St. And., M.R.C.S. & L.S.A.	18, Mount Street, Grosvenor Sq.
Pascall, W. L., L.S.A. - -	17, Charlotte Street, Fitzroy Sq.
Parkes, W. B., M.D. Erlang., F.R.C.S. & L.S.A.	31, Great Marlborough Street.
Pretty, Jno. Rowlison, M.D. St. And., M.R.C.S., & L.S.A.	31, Bayham Terrace, Camden Town.
Paul, Jas Thos., L.S.A. - -	26, Burton Crescent.
Pinder, Edwd., L.R.C.S. & L.S.A.	9, Oakley Terrace, Old Kent Road.
Powell, W. M., M.R.C.S. - -	14, Springfield Place, Wandsworth Road.
Pridham, T. L., M.R.C.S. & L.S.C.	Bideford, Devon.
Pretty, Wm., M.R.C.S - -	70, Mornington Road.
Pullin, Thos. Hy. S., M.R.C.S. -	Sidmouth, Devon.
Paine, H. J., M.R.C.S. - -	Cardiff.
Rogers, W. R., M.D., Heidelberg, L.S.A.	56, Berners Street, Marylebone.
Robarts, H. P., F.R.C.S. - -	11, Great Coram Street, Russell Sq.
Rushforth, Richard, M.D. Erlang., L.S.A.	44, Upper Norton Street, Marylebone.
Robinson, Thomas, M.R.C.S. & L.S.A.	Southampton Street, Pentonville.
Radcliffe, Derwentwater, M.R.C.S. & L.S.A.	51, Strand.

Name.	Address.
Ridge, Benjn., M.D., M.R.C.S., & L.S.A.	High Street, Putney.
Roods, H. C., M.D. & M.R.C.S. -	32, Bloomsbury Street, Bedford Square.
Ruttledge, Jas., M.D. Glasgow -	19, George Street, Hanover Square.
Rose, John, M.R.C.S. & L.S.A. -	1, Trinidad Place, Islington.
Robertson, John, L.R.C.S. -	Stanley, Perthshire, N. B.
Riches, Thos. H., L.S.A. - -	London Street, Greenwich.
Robins, Wm., L.S.A. - -	41, Oxford Terrace, Hyde Park.
Roper, George, M.R.C.S. & L.S.A.	180, High Street, Shoreditch.
Read, Reginald, L.S.A. - -	1, Guildford Place, Russell Square.
Read, Septimus, L.S.A. - -	41, Jewin Street, Cripplegate.
Sanderson, A. M., F.R.C.S. -	19, Bridge Street, Musselburgh, N. B.
Smith, Anderson, M.R.C.S. & L.S.A.	4, Northumberland Terrace, Bagnigge Wells Road.
Stewart, Hy. C., M.R.C.S. -	42, Grove Road, St. John's Wood.
Stevens, Wm., L.S.A. - -	6, Lansdowne Villas, Fulham Road.
Snell, Edmund, M.R.C.S. - -	18, Crown Row, Mile End Road.
Smith, Geo., M.R.C.S. - -	Axbridge.
Sewell, Eade, M.R.C.S. & L.S.A.	Englefield Road, Hackney.
Stokes, Hy. J., M.D. Edin. -	23, Portland Place, Islington.
Semple, Wm., M.R.C.S & L.S.A.	38, Upper Street, Islington.
Scatliff, Arthur, M.R.C.S & L.S.A.	1, Grosvenor Place, Brixton.
Schulhof, Maurice, M.D. - -	7, Suffolk Place, Pall Mall, East.
Statham, Hugh, M.R.C.S. & L.S.A.	16, Belmont Place, Wandsworth Road.
Stevens, N. Hy., M.R.C.S. - -	2, Finsbury Place South, Finsbury Square.
Smiles, John Finch, L.S.A. -	South Bar Street, Banbury.
Simmonds, H. M., M.R.C.S. & L.S.A.	76, Albany Road, Camberwell.
Smyth, Jno. Edwd., M.R.C.S. & L.S.A.	2, China Terrace, Lambeth.
Smith, E. Pye, F.R.C.S.E. - -	Mare Street, Hackney.
Sandys, Saml., M.R.C.S. & L.S.A.	4, Francis Terrace, Kentish Town.
Sutherin, Hy., M.R.C.S. - -	22, Church Row, Pancras Road.
Scarnell, S. F., L.S.A. - -	1, Langton Place, Vassall Road, Brixton.
Spooner, Edwd. O., F.R.C.S. -	White Mill, Blandford.
Smith, Chas., M.R.C.S. & L.S.A.	1, Upper Craven Place, Kentish Town.
Spettigue, John, M.R.C.S. & L.S.A.	3, Bicton Terrace, Littleham, Exmouth.
Smith, Thomas Hy., M.R.C.S. & L.S.A.	13, John Street, Berkeley Square.
Thompson, J. B., L.R.C.S. - -	Alva, N. B.

Name.	Address.
Turner, Saml. Mayer, F.R.C.S. -	Newcastle-under-Lyne, Staffordshire.
Taylor, John, M.R.C.S. & L.S.A.	64, Queen's Road, Bayswater.
Tweed, J. J., M.R.C.S. & L.S.A. -	14, Upper Brook Street, Grosvenor Square.
Trousdale, Alfred, M.R.C.S. -	Epworth near Bawtry.
Tweedie, A. C., M.R.C.S. - -	Galashiels, N. B.
Tapson, John, M.D., M.R.C.S. & L.S.A.	High Street, Clapham.
Timms, Godwin Wm., M.D. Lond., & M.R.C.S.	28, Paddington Green.
Townley, Jas., F.R.C.S. & L.S.A.	Kennington Common.
Thomas, Jno. Hy., M.R.C.S. & L.S.A.	Upper Street, Islington.
Tanner, Robt, M.R.C.S. & L.S.A.	56, Manchester Street, Manchester Square.
Turnbull, William, L.S.A. - -	62, Great Russell St., Bloomsbury.
Todd, J. M., M.R.C.S. & L.S.A. -	10, Kent Terrace, New Cross Road, Deptford.
Taylor, Thos., M.R.C.S. - -	High Street, Cricklade.
Vinen, J. Northcote, L.S.A. -	114, Tooley Street.
Ward, N. B., M.R.C.S. - -	14, Clapham Rise.
Wetherfield, John, M.R.C.S. -	1, Henrietta Street, Covent Garden.
Wallace, Richd., F.R.C.S. & L.S.A.	1, Trafalgar Place, West Hackney Road.
Woodforde, W. T. G., M.D. Lond.	37, High Street, Bow.
Whittle, E., M.D. Lond. - -	129, Mill Street, Liverpool.
Watson, John, L.S.A. - -	13, Southampton Street, Bloomsbury.
Webb, F. C., M.D. Edin., M.R.C.S.	39, Great Coram Street.
Ward, Martindale, M.R.C.S. & L.S.A.	1, King's Parade, Chelsea.
Weston, E. J., M.R.C.S. - -	17, St. Mark's Crescent, Regent's Park.
Wise, R. S., M.D., M.R.C.S. -	High Street, Banbury.
Wright, Edwd., M.R.C.S. & M.S.A.	5, Kennington Row, Kennington.
Weathers, George, M.R.C.S. & L.S.A.	41, High Street, Camden Town.
Waggett, Jno., M.D. - -	1, Norland Square, Notting Hill.
Walker, David, R. G., M.R.C.S. -	Budleigh, Salterton, Devon.
Williamson, Thos., M.D. - -	33, Charlotte Street, South Leith, N. B.
Winnard, J. T., M.R.C.S. - -	Standish-gate, Wigan.
Young, Chas., M.R.C.S. & L.S.A.	Turner's Hill, Worth, Sussex.
Young, Jas. Forbes, M.D. Edin., & L.S.A.	17, Upper Kennington Lane.

HOSPITALS, &c.

Name.	Address.
St. Mary's Hospital.	
Alderson, Jas., M.D. - - -	20, Berkeley Square.
Chambers, Thos. K., M.D. - -	1, Hill Street, Berkeley Square.
Jones, C. Handfield, M.D. - -	1, Southwick Place, Hyde Park.
Sibson, Francis, M.D. - -	40, Brook Street, Grosvenor Square.
Sieveking, E. H., M.D. - - -	3, Bentinck Street, Manchester Square.
St. Thomas's Hospital.	
Barker, T. A., M.D. - - -	71, Lower Grosvenor Street.
Whitfield, Richd. G. - - -	Resident Medical Officer at St. Thomas's Hospital.
Chelsea Hospital.	
Maclachlan, D., M.D. - -	Royal Hospital, Chelsea.
St. George's Hospital.	
Barclay, A. Whyte, M.D. - -	Medical Registrar to the Hospital. 23a, Bruton Street, Berkeley Sq.
Westminster Hospital.	
Fincham, George T., M.D. - -	28, Chapel Street, Belgrave Square.
Roe, Hamilton, M.D. - -	26, Upper Brook Street, Grosvenor Square.
Charing Cross Hospital.	
Golding, B., M.D. - - -	King William Street, Strand.
Middlesex Hospital.	
Sibley, Septimus W. - - -	Medical Registrar to the Hospital.
University College Hospital.	
Hillier, Thos., M.B., London -	Resident Medical Officer.
Royal Free Hospital, Gray's Inn Lane.	
Curgenven, J. Brendon - -	Resident Medical Officer.
St. Bartholomew's Hospital.	
Martin, Robert, M.D. - -	St. Bartholomew's Hospital.
Bethnal House Lunatic Asylum.	
Austin, Thos., M.R.C.S. & L.S.A.	Bethnal House, Bethnal Green.
London Hospital.	
Fraser, Patrick, M.D. - -	62, Guildford Street, Russell Square.
Davies, Herbert, M.D. - -	23, Finsbury Square.

Name.	Address.
Seamen's Hospital ("Dreadnought").	
Complin, Edwd. Jno., M.R.C.S. & L.S.A.	Hospital Ship "Dreadnought."
Royal Hospital, Greenwich.	
Liddell, Sir Jno., M.D.	"
M'Ternan, Jas.	
Nesbet, Alex., M.D.	
Whitmarsh, John.	
Christ's Hospital, Newgate Street.	
Stone, Thos., M.R.C.S. - -	Christ's Hospital.
H.M. Dockyard, Woolwich.	
Browning, Colin Arrott, M.D. -	Surgeon to H.M. Dockyard, Woolwich.
Middlesex House of Detention.	
Wakefield, Henry, M.R.C.S. -	52, Russell Square.
Caledonian Asylum.	
Bradley, C. L., M.R.C.S. - -	4, Belitha Villas West, Barnsbury Park.
Royal Military Asylum.	
Balfour, T. G., M.D. - - -	Surgeon to Royal Military Asylum.
Naval Hospital, Walmer.	
Johnston, J. W., M.D. - -	Deputy Inspector of Naval Hospitals.
Homœopathic Hospital.	
Yeldham, Stephen, M.R.C.S.E. & L.S.A.	*See* Parliamentary Return, Cholera, No. 255, Session 1855.
Leadham, Thos. R., M.R.C.S.E. & L.S.A.	
Mackern, Thomas, L.R.C.S.I.	
Cameron, Hugh, M.R.C.S.E.	
Wielobycki, S., M.D.	
Hill, John Hutton, M.D.	
Wyld, Geo., M.D.	
Baikie, Robt., M.D.	
Henry, Alexr., M.D.	
Smith, Dan., M.R.C.S.E. & L.S.A.	
Morgan, William, M.R.C.S.E.	
Quin, F. P., M.D.	
Hamilton, Edward, M.D.	

Instructions and Forms for Returns of Cases.

A.—DIARRHŒA.

SHEET OF INSTRUCTIONS AND EXAMPLES.

(Attention is particularly requested to the following Instructions, as the Value of the Returns will depend on their Uniformity.)

INSTRUCTION I.—The following *degrees or stages of the disease* should, when possible, be distinguished:—

Diarrhœa.
1. *Simple.*—Alvine discharges liquid, but fæcal. Vomiting and cramps absent.
2. *Choleraic.*—Alvine discharges very copious, watery, still tinged with bile. Vomiting generally present, but not continued or urgent. Cramps absent.

ALL CASES OF "DIARRHŒA" ARE TO BE ENTERED ON THE SHEET A. AS SOON AS THEY ARE SEEN.

SO SOON AS THE "CHOLERAIC DIARRHŒA" PASSES INTO "CHOLERA," THE FACT SHOULD BE RECORDED IN THE PROPER COLUMN OF THIS RETURN (A), AND THE PEN SHOULD BE DRAWN THROUGH THE CASE, ALL THE PARTICULARS OF WHICH SHOULD THEN BE TRANSFERRED TO THE "RETURN B.," AND ITS SUBSEQUENT COURSE BE THERE RECORDED.

INSTRUCTION II. *Absence of Stages.*—The commencement of "Choleraic Diarrhœa" is generally marked by vomiting; and when vomiting exists from the very beginning, the word "*absent*" or "*abs.*" may be written opposite "Simple Diarrhœa" in the Return.

INSTRUCTION III. *Dates.*—When the time of commencement of either stage cannot be ascertained, the words "*not known*" or "*n. k.*" should be written in the place of the date: but the time of commencement may generally be stated approximately. (*See* Instruction III. Return B.)

INSTRUCTION IV. *Treatment.*—The nature of the treatment should be indicated in the Return as concisely as possible. When any uniform and definite plan of treatment is adopted in a series of cases, that plan should be accurately described in the space for "REMARKS," and should be indicated in the Table by one or two words, as "*Conf. Arom. c. Op.*," "*Sulph. Ac.*," &c.

A.—DIARRHŒA—*continued.*

FORM OF RETURNS.

(Attention is particularly requested to the Sheet of Instructions and Examples.)

GENERAL RETURN OF THE NUMBER OF CASES OF DIARRHŒA NOT PASSING INTO CHOLERA.

Total Number of Cases.	Cases of Simple Diarrhœa not passing into further Stages.	Cases of Choleraic Diarrhœa not passing into further Stages.

ALL CASES OF DIARRHŒA, WITH PARTICULARS OF THEIR DURATION AND TREATMENT.

No. of Case.	Residence when attacked (Street and number of House.)	Sex. M.	Sex. F.	Age (last Birth-day.)	Rank and Occupation. (If Master, write Mast. after Name of Occupation.)	Degrees or Stages of the Disease.	Dates of their Commencement. Day.	Dates of their Commencement. Hour.	Date of Termination. In Recovery	Date of Termination. In Death.	Date of Termination. In Cholera.	Treatment. When commenced. Day.	Treatment. When commenced. Hour.	Treatment. Its Nature.
						Simple Diarrhœa - - Choleraic Diarrhœa -								
						S. Diarrh. - - - Ch. Diarrh. - - -								
						&c. &c.								

REMARKS.

The above is a correct Return of Cases of Cholera observed and treated by me.

Name_____

Professional Titles_____

Residence_____ Street_____ Parish_____ Registration sub-district_____

Instructions and Forms for Returns of Cases.

B.—CHOLERA.

SHEET OF INSTRUCTIONS AND EXAMPLES.

(Attention is particularly requested to the following Instructions, as the Value of the Returns will depend on their Uniformity.)

INSTRUCTION I.—*The following Degrees or Stages of the Disease* are generally recognized by the Medical Profession, and wherever it is possible should be distinguished. The terms adopted to designate them are in common use. All the stages are not present in every case.

Diarrhœa.

1. *Simple.*—Alvine discharges frequent and liquid, but fœcal. Vomiting and cramps absent.
2. *Choleraic.*—Alvine discharges very copious, watery, still tinged with bile. Vomiting generally present, but not continued or urgent. Cramps of extremities absent.

Cholera.

3. *Without Collapse.*—Alvine discharges watery, colourless, with white flakes (rice-water). Vomiting commonly urgent. Cramps of extremities frequent and severe. Eyes somewhat sunken. Temperature of surface lowered. Pulse small and feeble. Urine not secreted.
4. *With Collapse.*—Surface of face and extremities quite cold, often wet. Face and hands much shrunken, and more or less deeply livid. Cramps present. Pulse at wrist absent or scarcely to be felt. Veins of extremities contracted to dark threads. Urine not secreted. Voice usually much altered and feeble.
5. *Consecutive Fever.*—Temperature of surface more or less restored. Pulse distinct, sometimes full and throbbing. Veins more or less filled. Face less shrunken, or even full and deeply flushed. Drowsiness passing into stupor. Alvine discharges again containing bile. Urine, in most cases, still suppressed.

INSTRUCTION II. *Absence of Stages.*—The absence of any one or more of the earlier stages should be indicated by the word "*absent*" or "*abs.*," written opposite the deficient stage in the place of the date of commencement. The fact of the disease not reaching the later stages will be sufficiently shown by the mode of termination of the case, ("*death*," or "*recovery*,") being written opposite the stage at which the disease ceased.

INSTRUCTION III. *Dates.*—When the time of commencement of a particular stage cannot be ascertained, the words "*not known,*" or "*n. k.,*" should be written in the place of the date. But although the precise hour of the commencement of each stage cannot be determined exactly, except in rare instances, it may generally be stated approximately by taking some intermediate time between a known period when the symptoms of the particular stage were entirely absent, and one in which they were clearly developed.

INSTRUCTION IV. *Recovery.*—The date of recovery should be fixed at the time when all the symptoms of the disease, and all marked disturbances of health directly resulting from it, have disappeared, although some degree of debility may remain.

INSTRUCTION V. *Treatment.*—The nature of the treatment should be indicated in the Table as concisely as possible. When any uniform and definite plan of treatment is adopted in a series of cases, that plan should be accurately described in the space for "REMARKS," and should be indicated on the Table by one or two words, as "*Salines,*" "*Calomel c. Op.,*" "*Stimulants,*" "*Sulph. Ac.,*" &c.

INSTRUCTION VI.—If any patient at the time of the attack was already suffering from another disease, the nature of that disease and the treatment used for it should be mentioned in the "REMARKS."

B.—CHOLERA—*continued.*

FORM OF RETURNS.

(Attention is particularly requested to the Sheet of Instructions and Examples.)

GENERAL RETURN OF THE NUMBER OF CASES OF CHOLERA OBSERVED.

Total Number of Cases.	Cases of Cholera not passing into complete Collapse.	Cases of complete Collapse.	Number of foregoing Cases in which Consecutive Fever supervened.

ALL CASES OF CHOLERA, WITH PARTICULARS OF THE DURATION AND TREATMENT OF THE SEVERAL STAGES IN EACH CASE.

No. of Case.	Residence when attacked (Street and number of House.)	Sex. M.	Sex. F.	Age (last Birth-day.)	Rank and Occuaption. (If Master, write Mast. after the Name of Occupation.)	Degrees or Stages of the Disease.	Dates of their Commencement. Day.	Dates of their Commencement. Hour.	Termination of the Case. Death.	Termination of the Case. Recovery.	Dates of Death or Recovery. Day.	Dates of Death or Recovery. Hour.	Treatment in the several Stages.
						Simple Diarrhœa Choleraic Diarrhœa Cholera (without collapse) Collapse Consecutive Fever							
						S. Diarrh. Ch. Diarrh. Cholera Coll. Consec. F.							
						&c. &c.							

REMARKS.

The above is a correct Return of Cases of Cholera observed and treated by me.

Name_____

Professional Titles_____

Residence _____ Street_____ Parish_____ Registration sub-district_____

Memorandum on the foregoing "Instructions and Forms for Returns of Cases of Diarrhœa and Cholera."

In the Statistical Section of the Committee's Report, it is shown that the degrees of danger to which patients are exposed—or, on the other hand, their chances of recovery—are very different in the different stages of choleraic disease. As long as they suffer only from the diarrhœa stage, their chances of recovery are probably not less than 50 to 1. But on the symptoms of unequivocal cholera supervening, their chances of dying or recovering are nearly equal. If they pass into collapse, the chances are 2 to 1 against their recovery; while, if they survive this stage, but do not at once recover, their chances in the consecutive fever stages are 2 to 1 in favour of their recovery.

The risks attending the different stages of the diarrhœa and cholera had not before been measured. Yet it was well known that the danger increased as the disease advanced to the stage of complete cholera with collapse. The Medical Council, therefore, felt that the relative powers of different modes of treating cholera could not be estimated, unless the relative severity of the cases submitted to the several methods of cure and the stages at which the treatment was commenced in each case were known; and the Forms of Returns issued to medical practitioners (and reprinted in the Appendix) were drawn up with reference to this object. The degrees or stages of the disease which have been generally recognised by experienced writers, viz.:—simple diarrhœa, choleraic diarrhœa, cholera without collapse, cholera with collapse, and the consecutive fever, were distinguished in the Tabular Forms, and were described in brief definitions. Difficulty may sometimes have been experienced in identifying all the phases of particular cases with the stages thus defined; for the different stages, for the most part, pass one into another by almost imperceptible gradations; entire stages may be absent, or may, from their short duration, escape observation; and certain important symptoms may occur earlier or later than the stage of which they are usually characteristic. But in the large majority of cases, it will be possible to determine what is the predominant character of the group of symptoms present at a given time.

The simple diarrhœa does not differ from the ordinary sporadic diarrhœa in any known characters, except it be in the entire or nearly entire absence of pain.

The choleraic diarrhœa is, on the other hand characterized by the extraordinary copiousness of the discharges, and their watery nature, though bile is still present in them, and usually by the early occurrence of vomiting; and, further, by the exhaustion consequent on the loss of fluids, which is both felt by the patient and manifested in his countenance and pulse.

The distinction between choleraic diarrhœa and cholera without collapse will sometimes be attended with difficulty, or at least require care. Slight cramps occur in cases which are shown by all other characters to be as yet only in the stage of choleraic diarrhœa. The discharges may assume very early the rice-water character, while the other symptoms are not proportionally severe. In such cases the consideration of the symptoms collectively, with especial regard to the amount of exhaustion present and the rapidity of its increase, will usually lead to a correct judgment as to the existing degree or stage of the disease.

As the danger in cholera is so much affected by the presence or absence of collapse, it is most important that in all numerical reports of cases intended to illustrate the results of treatment, the character of the cases in this particular should be correctly stated. The essential phenomena of collapse are the more or less diminished volume of the blood and its slow movement, both of which may be best seen in the superficial veins. The complete or nearly complete absence of pulse at the wrist, the loss of heat, and the shrinking of the tissues in some degree are the necessary consequences of this state of the circulating fluid. But the dark or livid colour of the surface of the body is subject to great variety in cases of equally advanced collapse; it appears to be dependent, at least in great part, on the colour and other conditions of the skin in health, and is imperfectly developed in persons of fair and pale complexion. It is, therefore, not an essential phenomenon of collapse.

The stage denominated consecutive fever cannot be precisely defined. For the morbid conditions which too often succeed to the collapse of cholera are various. Those best known are the imperfect reaction from collapse, the state of uræmia, and the states of sympathetic fever and other disturbance of the general system attending inflammation of the lungs, ulceration and sloughing of the intestines, or suppuration of the parotids. The same mode of treatment cannot be equally applicable to all these different forms of consecutive disease. A valuable addition, therefore, will be made to our knowledge, if in future returns it be stated in each case what was the form of consecutive disease submitted to the treatment.

No. II.

Statistical Tables and other Documents illustrating the Report of the Medical Council's Committee for Scientific Purposes.

I.—The FIRST SERIES of TABLES (I. to XI.) was compiled by Mr. Lindsey Blyth, from the Medical Returns (A. B.), which were filled up by the Medical Practitioners of London, and of some other districts in which cholera prevailed.

II.—The SECOND SERIES of Tables (I. to X.) was compiled by Mr. Henry Edwards, assisted by Mr. C. Taylor, and others, from the Registers of Deaths, with the permission of the Registrar-General.

III.—The THIRD SERIES of TABLES, comprising Deductions and Numerical Results, partly taken from the preceding Tables, and partly from the Registrar-General's Weekly Tables. The additional Tables are calculated by Mr. F. J. Williams.

FIRST SERIES.

TABLE I.

Where the Cases were observed.	CHOLERA.			CHOLERA and DIARRHŒA.	DIARRHŒA.		
	Cases.	Recoveries.	Deaths.	Total Cases, Cholera and Diarrhœa.	Deaths.	Recoveries.	Cases.
In Hospitals - - -	1,502	739	763	2,190	8	680	688
Out of Hospitals - -	1,686	982	704	18,458	101	16,671	16,772
Total in London -	3,188	1,721	1,467	20,648	109	17,351	17,460
Provincial Districts, England	586	348	233	2,762	40	2,136	2,176
Provincial Districts, Scotland	497	254	243	1,162	7	658	665
Total - - -	4,271	2,323	1,948	24,572	156	20,145	20,301

FIRST SERIES—*continued.*

TABLE II. — THREE GROUPS of CASES of DIARRHŒA, distinguishing those that were returned in the prescribed Forms.

——	Cases.	Recoveries.	Deaths
(1.) Diarrhœa, simple and choleraic, (cases returned only in the aggregate)	9,103	9,075	28
(2.) Diarrhœa, simple and choleraic, (which have been returned in detail in prescribed forms)	10,323	10,200	123
(3.) Diarrhœa, simple and choleraic, returned in the prescribed forms, (passing into other diseases)	15	9	6
Total	19,441	19,284	157

None of these cases, even when fatal, passed into the stages of cholera or collapse; fifteen, however, passed into dysentery, fever, and other diseases.

TABLE III.—CASES of CHOLERA, distinguishing their Form at the commencement, as stated in the Returns.

Returned as commencing in	Cases.	Recoveries.	Deaths.
(1.) Diarrhœa	1,317	699	618
(2.) Choleraic Diarrhœa	360	188	172
(3.) Cholera	199	86	113
(4.) Collapse	6	1	5
(5.) Mode of origin unknown	1,816	947	869
Total	3,698	1,921	1,777

FIRST SERIES—*continued.*

TABLE IV.—The same CASES of CHOLERA as in Table III., distinguishing the MODES of TERMINATION.

Returned as terminating in the stage of	Cases.	Recoveries.	Deaths.
(1.) Cholera (without collapse) - -	924	813	111
(2.) Cholera (with collapse) - -	1,798	391	1,407
(3.) Consecutive fever (preceded by cholera or collapse) - - - -	874	625	249
(4.) Stage of termination doubtful - -	102	92	10
Total - - - -	3,698	1,921	1,777

TABLE V.—CASES of CONSECUTIVE FEVER, distinguishing those preceded by COLLAPSE, and those preceded by CHOLERA without COLLAPSE.

	Total Cases.	Recoveries.	Deaths.
Preceded by cholera - - -	874	625	249
Namely, by cholera without collapse -	223	197	26
By cholera with collapse - - -	585	386	199
And by cholera in which this point was not recorded - - - -	66	42	24

TABLE VI.—Cases of DIARRHŒA and CHOLERA, distinguishing the Mode of ORIGIN and TERMINATION (including those Cases of Diarrhœa returned in the aggregate, without the details of Age and other circumstances).

—	TERMINATING IN																				
	TOTAL.			DIARRHŒA.			CHOLERA.			COLLAPSE.			CONSECUTIVE FEVER.			DYSENTERY AND OTHER DISEASES.			STAGE OF TERMINATION DOUBTFUL.		
	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.
TOTAL CASES -	23,139	21,205	1,934	19,426	19,275	151	924	813	111	1,798	391	1,407	874	625	249	15	9	6	102	92	10
Returned as Commencing in diarrhœa	21,118	20,171	947	19,426	19,275	151	310	290	20	793	181	612	561	404	157	15	9	6	13	12	1
Commencing in cholera	199	86	113	—	—	—	22	20	2	118	20	98	59	46	13	—	—	—	—	—	—
Commencing in collapse	6	1	5	—	—	—	—	—	—	5	1	4	1	—	1	—	—	—	—	—	—
Mode of origin unknown	1,816	947	869	—	—	—	592	503	89	882	189	693	253	175	78	—	—	—	89	80	9

First Series—*continued.*

Table VII.—Of the Duration of Cases of Recovery and Death from Cholera and from Diarrhœa in

MALES.

Duration.	Cholera.			Diarrhœa.			Duration.
Days.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Days.
0—	58	15	43	130	127	3	0—
½—	201	17	184				½—
1—	130	7	123				1—
1½—	55	1	54				1½—
0—	444	40	404	130	127	3	0—
1—	300	77	223	602	594	8	1—
2—	222	117	105	519	516	3	2—
3—	180	127	53	338	329	9	3—
4—	151	110	41	209	205	4	4—
5—	105	84	21	161	155	6	5—
6—	87	69	18	116	112	4	6—
7—	81	64	17	81	77	4	7—
14—	256	215	41	202	197	5	14—
21—	60	54	6	51	51	0	21—
28—	29	27	2	12	10	2	28—
Not known	17	8	9	0	0	0	Not known.
Total -	1932	992	940	2421	2373	48	Total.

Table VIII.—Of the Duration of Cases of Recovery and Death from Cholera and from Diarrhœa in

FEMALES.

Duration.	Cholera.			Diarrhœa.			Duration.
Days.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Days.
0—	48	16	32	154	151	3	0—
½—	146	15	131				½—
1—	144	10	134				1—
1½—	34	1	33				1½—
0—	372	42	330	154	151	3	0—
1—	290	85	205	671	669	2	1—
2—	181	100	81	600	592	8	2—
3—	162	109	53	363	360	3	3—
4—	120	87	33	295	290	5	4—
5—	80	59	21	189	188	1	5—
6—	76	53	23	129	126	3	6—
7—	96	71	25	106	101	5	7—
14—	232	195	37	268	261	7	14—
21—	57	54	3	62	61	1	21—
28—	19	17	2	13	12	1	28—
Not known	18	14	4	0	0	0	Not known.
Total -	1703	806	817	2850	2811	39	Total.

The Table may be read thus: of 1,703 cases of Cholera in Females, the duration was not returned in 18 instances; 48 cases terminated in less than 6 hours, or the ¼ of a day; 146 in 6 and less than 12 hours (or ¼ to ½ day), and so on; thus, 372 cases terminated in less than 24 hours, or in one day, namely, 42 in recovery, 330 in death.

FIRST SERIES—*continued.*

TABLE IX.—CASES of CHOLERA and DIARRHŒA occurring in PERSONS of different Ages, and distinguishing the Number of RECOVERIES and DEATHS at each Age.

Ages.	CHOLERA and DIARRHŒA.			CHOLERA.			DIARRHŒA.		
	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.
0—	196	163	33	23	10	13	173	153	20
1—	192	171	21	22	12	10	170	159	11
2—	187	142	45	68	27	41	119	115	4
3—	194	125	69	98	32	66	96	93	3
4—	170	117	53	83	31	52	87	86	1
	939	718	221	294	112	182	645	606	39
5—	202	137	65	131	67	64	71	70	1
10—	494	379	115	240	128	112	254	251	3
15—	398	330	68	185	120	65	213	210	3
20—	705	597	108	299	195	104	406	402	4
25—	816	692	124	341	218	123	475	474	1
30—	969	821	148	357	210	147	612	611	1
35—	866	698	168	362	196	166	504	502	2
40—	795	648	147	302	158	144	493	490	3
45—	584	455	129	240	112	128	344	343	1
50—	499	392	107	185	80	105	314	312	2
55—	411	305	106	205	100	105	206	205	1
60—	378	282	96	154	65	89	224	217	7
65—	285	213	72	112	46	66	173	167	6
70—	266	186	80	103	28	75	163	158	5
75—	142	105	37	50	15	35	92	90	2
80—	81	53	28	33	7	26	48	46	2
85—	41	27	14	13	3	10	28	24	4
90—	8	6	2	3	1	2	5	5	—
95—	2	2	—	1	1	—	1	1	—
100	1	—	1	1	—	1	—	—	—
N.K.	74	66	8	24	16	8	50	50	—
Total	8,956	7,112	1,844	3,635	1,878	1,757	5,321	5,234	87

FIRST SERIES—*continued.*

TABLE X.—CASES of CHOLERA and DIARRHŒA occurring in MALES of different Ages, and distinguishing the Number of RECOVERIES and DEATHS at each age.

Ages.	CHOLERA and DIARRHŒA.			CHOLERA.			DIARRHŒA.		
	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.
0—	526	394	132	180	70	110	346	324	22
5—	108	68	40	72	33	39	36	35	1
10—	265	207	58	128	72	56	137	135	2
15—	222	182	40	113	76	37	109	106	3
25—	726	602	124	340	219	121	386	383	3
35—	872	696	176	395	221	174	477	475	2
45—	632	489	143	279	136	143	353	353	—
55—	405	303	102	180	79	101	225	224	1
65—	291	212	79	124	51	73	167	161	6
75—	221	158	63	81	21	60	140	137	3
85—	71	42	29	28	4	24	43	38	5
95—	2	2	—	—	—	—	2	2	—
100	—	—	—	—	—	—	—	—	—
N.K.	12	10	2	12	10	2	—	—	—
Total	4,353	3,365	988	1,932	992	940	2,421	2,373	48

TABLE XI.—CASES of CHOLERA and DIARRHŒA occurring in FEMALES of different Ages, and distinguishing the Number of RECOVERIES and DEATHS at each Age.

Ages.	CHOLERA and DIARRHŒA.			CHOLERA.			DIARRHŒA.		
	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.	Cases.	Recoveries.	Deaths.
0—	413	324	89	114	42	72	299	282	17
5—	94	69	25	59	34	25	35	35	—
10—	229	172	57	112	56	56	117	116	1
15—	176	148	28	72	44	28	104	104	—
25—	795	687	108	300	194	106	495	493	2
35—	963	823	140	324	185	139	639	638	1
45—	747	614	133	263	134	129	484	480	4
55—	505	394	111	210	101	109	295	293	2
65—	372	283	89	142	60	82	230	223	7
75—	187	133	54	72	22	50	115	111	4
85—	51	38	13	18	6	12	33	32	1
95—	8	6	2	4	2	2	4	4	—
100—	1	—	1	1	—	1	—	—	—
N.K.	12	6	6	12	6	6	—	—	—
Total	4,553	3,697	856	1,703	886	817	2,850	2,811	39

FIRST SERIES—*continued.*

TABLE XII.—PROPORTIONAL NUMBER of DEATHS, at Twelve different Ages, to every 100 Cases of CHOLERA and DIARRHŒA, in the year 1854.

Age.	To 100 Cases of CHOLERA, at each Age, the Number of Deaths.	To 100 Cases of DIARRHŒA, at each Age, the Number of Deaths.
All Ages	48·3	1·6
0—	61·8	6·0
5—	48·5	1·4
10—	46·7	1·2
15—	34·9	1·4
25—	35·4	0·6
35—	43·4	0·3
45—	50·1	0·5
55—	53·8	0·6
65—	58·2	3·2
75—	71·4	2.7
85—	78·3	0·8
95 & upwards.	60·0	—

The Table may be read thus:—Out of 100 cases of Cholera, which occurred in 1854, at the age of 25 and under 35, there were 35·4 deaths and 64·6 recoveries; out of 100 cases of Diarrhœa, at the same age, there were 0·6 deaths, and consequently 99·4 recoveries, and so on for other ages.

TABLE XIII.—SUMMARY of Two Sets of SCOTCH RETURNS—No. I. from first appearance of CHOLERA in Scotland to 1st April 1854, and No. II. from 1st April 1854 to January 10th 1855.

Number of Parishes in Scotland.	Total Number of Parishes in which Cholera appeared.	Dates of first and last Cases in Returns No. I. & II.	Total Number of Cases.	Total Number of Deaths.
883	227*	31st Aug. 1853 — 17th Nov. 1854	14,430*	6,848*

* These numbers are larger than the combined totals in Returns No. I. and II. to the extent of 1 parish, 5 cases, and 4 deaths, reported to the Board of Supervision subsequent to the dispatch of Return No. I. to the General Board of Health on 18th May 1854.

W. S. WARREN,
Secretary.

Board of Supervision,
Edinburgh, 10th January 1855.

TABLE I.—Showing the DEATHS in LONDON from CHOLERA and DIARRHŒA on each DAY from 1st July 1853 to 31st December 1854, both inclusive
(C. denotes DEATHS from CHOLERA, and D. DEATHS from DIARRHŒA.)

Day of the Month.	1853.												1854.																							
	July.		Aug.		Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		April.		May.		June.		July.		Aug.		Sept.		Oct.		Nov.		Dec.	
	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.	C.	D.
1	–	6	–	20	1	21	11	14	15	10	–	10	–	6	–	7	–	6	–	5	–	7	–	4	–	6	72	31	389	41	70	13	1	9	–	2
2	–	7	1	21	4	23	9	14	15	5	4	7	–	3	–	3	–	4	–	7	–	5	–	9	–	7	79	27	459	36	61	17	2	11	1	5
3	–	8	–	13	5	24	10	13	12	7	2	8	–	4	–	2	–	2	1	6	–	6	–	3	–	8	78	28	329	49	76	13	4	4	–	3
4	–	9	1	23	2	20	7	10	22	22	1	1	–	3	–	7	–	2	1	3	–	5	–	8	–	8	78	29	305	38	53	20	11	7	–	3
5	–	7	1	18	–	31	7	13	7	3	4	3	–	3	–	4	–	1	–	3	–	1	–	8	1	12	101	26	267	47	60	16	8	11	1	2
6	–	9	4	25	1	11	6	11	15	10	1	6	–	2	–	4	–	7	–	5	–	3	–	6	–	7	104	34	259	47	41	26	4	6	1	6
7	1	12	7	30	–	16	12	9	13	15	4	7	–	7	–	2	–	4	–	5	–	3	–	4	1	9	78	28	235	35	37	15	2	7	–	3
8	–	5	2	22	2	16	7	7	16	11	1	8	1	4	–	4	–	6	–	3	–	6	1	3	2	8	107	34	215	34	47	21	1	8	–	2
9	–	10	2	27	1	16	10	8	12	2	4	4	–	4	–	7	–	8	–	5	–	5	–	9	1	6	96	25	259	39	37	24	6	8	–	5
10	–	10	2	22	–	23	3	7	19	8	–	4	1	10	1	4	–	9	–	3	–	1	–	7	–	10	83	31	256	29	38	19	–	–	–	5
11	1	9	2	29	3	6	7	7	15	9	–	5	–	4	–	4	–	4	–	6	–	5	–	3	–	10	105	49	233	52	29	11	–	5	–	10
12	–	10	5	25	3	14	7	8	11	4	2	9	1	4	–	1	–	3	–	6	–	3	–	8	2	8	98	36	246	36	17	18	3	6	–	3
13	–	11	2	38	2	10	9	12	10	8	–	9	–	6	–	2	–	4	2	4	–	6	–	3	1	10	108	33	203	45	24	18	2	7	–	8
14	2	12	2	21	4	15	3	7	12	9	1	6	–	6	–	6	–	12	–	8	–	1	–	11	1	4	116	32	158	30	35	11	2	8	–	2
15	1	14	1	24	4	8	8	10	9	4	1	3	–	10	–	9	–	6	–	6	1	7	–	5	1	11	90	31	208	30	32	17	1	5	–	5
16	1	16	–	19	3	11	14	9	4	9	–	7	–	4	–	8	–	4	–	4	–	2	1	8	4	10	115	33	223	30	19	13	–	6	–	4
17	1	14	1	26	6	17	14	11	10	3	3	3	1	9	–	8	–	4	–	6	–	6	1	9	2	11	125	36	190	39	26	14	1	5	–	5
18	–	15	–	22	1	17	16	11	11	10	2	4	1	3	–	3	–	4	–	3	–	3	–	7	3	16	97	36	179	21	18	21	1	7	–	5
19	1	18	1	20	5	11	7	7	9	4	2	1	–	5	–	7	–	6	–	2	1	4	–	1	7	8	121	24	208	36	25	18	–	2	–	3
20	1	12	5	27	5	13	13	11	10	4	1	7	–	7	–	5	–	6	–	5	–	10	–	3	5	13	118	39	167	25	8	10	2	4	–	5
21	1	10	5	31	7	16	9	6	5	3	1	6	–	2	–	5	–	5	–	2	–	6	–	5	6	9	131	28	142	29	15	10	1	2	–	6
22	1	9	3	20	1	11	22	10	6	10	–	5	–	5	–	5	–	4	–	3	–	5	–	8	6	12	131	39	159	26	13	11	–	3	2	3
23	1	16	2	16	3	11	14	7	6	11	1	4	–	5	–	5	–	4	–	4	–	5	–	3	17	13	131	33	137	30	5	10	2	3	–	5
24	–	10	3	19	2	14	10	5	4	4	1	7	–	9	–	7	–	3	–	6	–	5	–	2	16	17	140	41	129	28	12	9	–	8	–	2
25	1	17	3	14	8	13	6	9	4	4	–	10	–	6	1	7	–	5	–	5	–	3	–	8	24	24	118	29	104	30	3	2	–	5	–	4
26	1	15	5	16	9	13	14	10	4	5	1	4	–	3	1	5	–	9	–	6	1	2	–	4	20	15	100	36	106	26	4	9	–	8	–	–
27	2	22	3	21	11	14	14	12	2	8	4	6	–	6	–	3	–	7	–	1	1	3	–	6	23	11	122	26	90	20	6	10	1	3	–	4
28	2	12	2	26	4	18	16	6	2	8	1	8	1	5	–	3	–	3	–	4	–	4	–	4	27	25	141	41	88	25	5	7	1	3	–	2
29	1	19	2	35	6	12	14	5	4	3	–	9	–	6	–	–	–	2	–	5	–	6	–	5	53	17	137	38	75	20	4	6	1	5	–	1
30	–	18	2	28	8	9	11	8	4	5	1	7	–	9	–	–	–	1	–	7	–	8	–	5	41	26	187	29	66	17	3	8	–	4	–	–
31	2	18	1	25	–	–	25	6	–	–	–	9	1	4	–	–	–	9	–	–	–	5	–	–	44	20	211	40	–	–	–	9	–	–	–	–
Total -	21	380	67	723	111	454	335	283	288	218	43	187	7	164	3	137	–	154	4	138	4	141	3	169	308	371	3,513	1,022	6,084	990	823	426	52	175	5	113

TABLE II.—DEATHS from CHOLERA and DIARRHŒA on each DAY of Five Months of the Year 1849.

Day of the Month.	June.			July.			August.			September.			October.		
	Chol.	Diarr.	Total.	Chol.	Diarr.	Total.	Chol.	Diarr.	Total.	Chol.	Diarr.	Total.	Chol.	Diarr.	Total.
1	1	1	2	19	12	31	142	29	171	250	42	292	41	16	57
2	2	7	9	37	14	51	123	36	159	282	38	320	55	20	75
3	2	5	7	30	10	40	98	29	127	316	37	353	31	13	44
4	—	2	2	20	3	23	138	27	165	336	42	378	22	20	42
5	3	2	5	21	10	31	127	30	157	314	41	355	28	16	44
6	4	3	7	29	8	37	96	25	121	297	44	341	20	16	36
7	10	3	13	35	14	49	110	29	139	284	34	318	23	19	42
8	7	9	16	34	12	46	128	38	166	311	41	352	13	11	24
9	7	5	12	45	19	64	104	20	124	299	34	333	11	11	22
10	5	12	17	67	11	78	124	32	156	264	47	311	16	10	26
11	9	8	17	58	12	70	157	23	180	226	39	265	14	9	23
12	5	7	12	46	14	60	166	30	196	192	46	238	7	12	19
13	9	3	12	79	16	95	214	21	235	217	38	255	9	6	15
14	5	7	12	91	15	106	204	32	236	156	43	199	5	4	9
15	7	5	12	97	24	121	185	30	215	153	46	199	7	7	14
16	10	7	17	121	24	145	173	35	208	120	41	161	3	10	13
17	7	1	8	79	28	107	151	25	176	131	33	164	3	7	10
18	12	1	13	84	28	112	155	42	197	109	30	139	2	9	11
19	6	7	13	101	27	128	168	41	209	119	30	149	2	7	9
20	8	2	10	120	31	151	214	40	254	89	25	114	1	7	8
21	8	7	15	126	29	155	193	37	230	69	26	95	4	6	10
22	6	4	10	109	34	143	158	27	185	75	30	105	1	5	6
23	8	3	11	104	45	149	180	51	231	71	29	100	2	7	9
24	14	10	24	95	35	130	203	32	235	62	29	91	3	4	7
25	10	1	11	123	32	155	240	27	267	63	24	87	—	7	7
26	16	3	19	114	39	153	220	46	266	46	18	64	4	8	12
27	23	8	31	109	33	142	249	29	278	57	18	75	2	6	8
28	24	4	28	117	28	145	280	28	308	38	20	58	5	7	12
29	27	6	33	121	24	145	238	39	277	41	20	61	2	4	6
30	24	7	31	172	24	196	243	35	278	44	27	71	1	6	7
31	—	—	—	152	29	181	187	28	215	—	—	—	—	5	5
Total	279	150	429	2,555	684	3,239	5,368	993	6,361	5,031	1,012	6,043	337	295	632

SECOND SERIES—*continued.*

TABLE III.—Showing the NUMBER of DEATHS by CHOLERA and DIARRHŒA in each DISTRICT of LONDON in the Year and half, 1853½ to 1854, distinguishing DEATHS in HOSPITALS.

No. of Districts.	Districts.	Deaths by Cholera, including Deaths in Hospitals.	Deaths by Cholera in Hospitals.	Deaths by Cholera, exclusive of Deaths in Hospitals.	Deaths by Diarrhœa.	Total.
	LONDON	11,661	800	10,861	6,258	17,119
	West Districts:					
1	Kensington	543	29	514	287	801
2	Chelsea	309	—	309	158	467
3	St. George, Hanover Square	303	64	239	130	369
4	Westminster	443	63	380	207	587
5	St. Martin-in-the-Fields	59	11	48	43	91
6	St. James, Westminster	497	—	497	43	540
	North Districts:					
7	Marylebone	397	128	269	349	618
	Hampstead	15	—	15	14	29
	Pancras	236	84	172	337	509
10	Islington	116	—	116	249	365
11	Hackney	91	—	91	127	218
	Central Districts:					
12	St. Giles	115	—	115	141	256
13	Strand	112	17	95	93	188
14	Holborn	28	—	28	94	122
15	Clerkenwell	67	—	67	127	194
16	St. Luke	55	—	55	161	216
17	East London	104	—	104	121	225
18	West London	116	87	29	51	80
19	London, City	79	—	79	60	139
	East Districts:					
20	Shoreditch	266	—	266	298	564
21	Bethnal Green	213	—	213	217	430
22	Whitechapel	427	65	362	227	589
23	St. George-in-the-East	175	—	175	156	331
24	Stepney	436	—	436	323	759
25	Poplar	218	—	218	137	355
	South Districts:					
26	St. Saviour, Southwark	551	49	502	195	697
27	St. Olave, Southwark	341	90	251	35	286
28	Bermondsey	923	—	923	209	1,132
29	St. George, Southwark	625	—	625	185	810
30	Newington	741	—	741	196	937
31	Lambeth	1,003	—	1,003	401	1,404
32	Wandsworth	450	—	450	153	603
33	Camberwell	581	—	581	180	761
34	Rotherhithe	308	—	308	105	413
35	Greenwich	613	113	500	308	808
36	Lewisham	85	—	85	81	166

St. Bartholomew's Hospital, in the West London District, contained 540 inmates in 1851.
The portions of Guy's and St. Thomas's Hospitals, in the District of St. Olave, Southwark, contained 772 inmates in 1851.

SECOND SERIES—*continued.*

TABLE IV.—Showing the TOTAL NUMBER of DEATHS from CHOLERA and DIARRHŒA registered in each of the DISTRICTS and SUB-DISTRICTS in LONDON, from 1st July 1853 to 31st December 1854, both inclusive.

	District.	Registrar's Sub-District.	Cholera.	Diar.	Total.
		West Districts.			
1	KENSINGTON	Paddington, St. Mary	33	47	80
		„ St. John	71	52	123
		Kensington Town	157	92	249
		Brompton	48	29	77
		Hammersmith, St. Peter	33	6	39
		„ St. Paul	96	29	125
		Fulham	105	32	137
2	CHELSEA	Chelsea, South	128	50	178
		„ North-west	101	47	148
		„ North-east	80	61	141
3	ST. GEORGE, HANOVER SQUARE.	Hanover Square	21	26	47
		Mayfair	32	13	45
		Belgrave	250	91	341
4	WESTMINSTER	St. John	192	104	296
		St. Margaret	251	103	354
5	ST. MARTIN IN FIELDS	Charing Cross	41	16	57
		Long Acre	18	27	45
6	ST. JAMES, WESTMINSTER.	Berwick Street	200	17	217
		St. James Square	20	6	26
		Golden Square	277	20	297
		North Districts.			
7	MARYLEBONE	All Souls	158	48	206
		Cavendish Square	12	15	27
		Rectory	99	65	164
		St. Mary	44	46	90
		Christ Church	49	98	147
		St. John	35	77	112
8	HAMPSTEAD	Hampstead	15	14	29
9	PANCRAS	Regent's Park	25	51	76
		Tottenham Court	90	64	154
		Gray's Inn Lane	60	41	101
		Somers Town	33	53	86
		Camden Town	27	72	99
		Kentish Town	21	56	77
10	ISLINGTON	Islington West	72	131	203
		„ East	44	118	162
11	HACKNEY	Stoke Newington	5	6	11
		Stamford Hill	9	14	23
		West Hackney	26	34	60
		Hackney	41	45	86
		South Hackney	10	28	38
		Central Districts.			
12	ST. GILES	St. George, Bloomsbury	13	32	45
		St. Giles, South	63	62	125
		„ North	39	47	86
13	STRAND	St. Ann, Soho	65	34	99
		St. Mary-le-Strand	13	22	35
		St. Clement Danes	34	37	71

SECOND SERIES—*continued.*

TABLE IV.—Showing Total Number of Deaths from Cholera registered, &c.—*continued.*

	District.	Registrar's Sub-District.	Cholera.	Diar.	Total.
14	HOLBORN	St. George Martyr	8	31	39
		St. Andrew, Holborn	12	48	60
		Saffron Hill	8	15	23
15	CLERKENWELL	St. James	25	54	79
		Arawell	17	28	45
		Pentonville	11	23	34
		Goswell Street	14	22	36
16	ST. LUKE	Old Street	9	19	28
		City Road	13	38	51
		Whitecross Street	21	68	89
		Finsbury	12	36	48
17	EAST LONDON	St. Botolph	49	72	121
		Cripplegate	41	49	90
18	WEST LONDON	West London, North	116	36	152
		„ South	17	15	32
19	CITY OF LONDON	London City, South West	15	9	24
		„ North West	8	9	17
		„ South	19	10	29
		„ South East	24	11	35
		„ North East	10	21	31
	East Districts.				
20	SHOREDITCH	Holywell	59	44	103
		St. Leonard	94	58	152
		Hoxton, New Town	36	58	94
		„ Old Town	22	56	78
		Haggerstone, West	38	61	99
		„ East	17	21	38
21	BETHNAL GREEN	Hackney Road	57	46	103
		Green	81	79	160
		Church	32	43	75
		Town	43	49	92
22	WHITECHAPEL	Artillery	24	15	39
		Spitalfields	46	40	86
		Mile End, New Town	100	49	149
		Whitechapel, North	52	35	87
		„ Church	78	13	91
		Goodman's Fields	37	37	74
		Aldgate	90	38	128
23	ST. GEORGE IN THE EAST.	St. Mary	60	55	115
		St. Paul	82	43	125
		St. John	33	58	91
24	STEPNEY	Shadwell	91	63	154
		Ratcliff	82	47	129
		Mile End, Old Town, Upper	39	69	108
		„ „ Lower	131	98	229
		Limehouse	93	46	139
25	POPLAR	Bow	81	59	140
		Poplar	137	78	215
			5,440	4,150	9,590

SECOND SERIES—*continued.*

TABLE IV.—Showing Total Number of Deaths from Cholera registered, &c.—*continued.*

	District.	Registrar's Sub-District.	Cholera.	Diar.	Total.
		South Districts.			
26	ST. SAVIOUR, SOUTHWARK.	Christ Church - - -	127	48	175
		St. Saviour - - -	424	147	571
27	ST. OLAVE, SOUTHWARK.	St. Olave - - - -	183	19	202
		St. John - - - -	158	16	174
28	BERMONDSEY - -	St. James - - -	388	64	452
		St. Mary Magdalen - -	275	73	348
		Leather Market - -	260	72	332
29	ST. GEORGE, SOUTHWARK.	Kent Road - - -	219	70	289
		Borough Road - - -	301	77	378
		London Road - - -	105	38	143
30	NEWINGTON - -	Trinity, Newington - -	224	69	293
		St. Peter, Walworth - -	419	111	530
		St. Mary - - -	98	16	114
31	LAMBETH - - -	Waterloo Road, 1st. - -	62	33	95
		„ 2nd. - -	128	67	195
		Lambeth Church, 1st. -	63	58	121
		„ 2nd. -	215	130	345
		Kennington, 1st. -	321	101	422
		„ 2nd. -	148	33	181
		Brixton - - - -	56	25	81
		Norwood - - - -	10	14	24
32	WANDSWORH - -	Clapham - - - -	178	38	216
		Battersea - - - -	181	60	241
		Wandsworth - - -	66	35	101
		Putney - - - -	9	6	15
		Streatham - - -	16	14	30
33	CAMBERWELL - - -	Dulwich - - - -	—	1	1
		Camberwell - - -	256	71	327
		Peckham - - - -	187	58	245
		St. George - - -	138	50	188
34	ROTHERHITHE - -	Rotherhithe - - -	308	105	413
35	GREENWICH - -	St. Paul, Deptford - -	108	67	175
		St. Nicholas, Deptford -	128	33	161
		Greenwich, West - -	173	50	223
		„ East - -	124	95	219
		Woolwich Dockyard -	20	31	51
		„ Arsenal - -	60	32	92
36	LEWISHAM - - -	Plumstead - - -	23	38	61
		Eltham - - - -	3	2	5
		Lee - - - -	16	16	32
		Lewisham Village - -	31	18	49
		Sydenham - - -	12	7	19
			6,221	2,108	8,329
		DISTRICTS NORTH OF THE THAMES -	5,440	4,150	9,590
		DISTRICTS SOUTH OF THE THAMES -	6,221	2,108	8,329
		TOTAL DISTRICTS - -	11,661	6,258	17,919

SECOND SERIES—*continued.*

TABLE V.—SUMMARY TABLE, showing the NUMBER of DEATHS from CHOLERA and DIARRHŒA in the following HOSPITALS and WORKHOUSES of London, from the 1st day of July 1853 to the 31st of December 1854, both inclusive.

	District.	Sub-district.	Hospital, Workhouse, &c.	Cholera.	Diarrhœa.	Total.
	Districts North of the Thames:					
1	KENSINGTON	Paddington, St. Mary	St. Mary's Hospital	29	–	29
			Paddington Workhouse	1	1	2
		Kensington Town	Kensington Workhouse	18	4	22
		Fulham	Earl's Court Workhouse*	4	10	14
			Fulham Workhouse	42	2	44
2	CHELSEA	Chelsea, North-west	Chelsea Workhouse	23	10	33
			St. George's Workhouse	18	8	26
3	ST. GEORGE, HANOVER SQUARE.	Mayfair	St. George, Hanover Square	19	4	23
		Belgrave	St. George's Hospital	64	5	69
4	WESTMINSTER	St. Margaret	Westminster Hospital	63	3	66
			Westminster Workhouse	49	20	69
5	ST. MARTIN-IN-THE-FIELDS.	Charing Cross	Charing Cross Hospital	11	–	11
			Charing Cross Workhouse	2	4	6
6	ST. JAMES, WESTMINSTER.	Golden Square	Workhouse, Golden Square	32	–	32
7	MARYLEBONE	All Souls	Middlesex Hospital	128	–	128
		Rectory	Marylebone Workhouse	46	14	60
8	HAMPSTEAD	Hampstead	Hampstead Workhouse	2	1	3
9	PANCRAS	Tottenham Court	University College Hospital	36	2	38
			Strand Workhouse	17	8	25
		Gray's Inn Lane	Royal Free Hospital	48	2	50
		Camden Town	Pancras Workhouse	15	5	20
10	ISLINGTON	Islington, West	Islington Workhouse	4	3	7
11	HACKNEY	Hackney	Hackney Workhouse	2	9	11
12	ST. GILES	St. Giles, South	St. Giles's Workhouse	35	5	40
13	STRAND	St. Clement Danes	King's College Hospital	17	1	18
14	HOLBORN	St. Andrew, Holborn	St. Andrew's Workhouse	–	9	9
15	CLERKENWELL	St. James	St. James's Workhouse	5	3	8
17	EAST LONDON	St. Botolph	St. Botolph Workhouse	10	18	28
18	WEST LONDON	West London, North	St. Bartholomew's Hospital	110	4	114
			Workhouse, Aldersgate	1	3	4
			Workhouse, West Street	–	4	4
20	SHOREDITCH	Hoxton New Town	St. Luke's Workhouse	17	14	31
		Haggerstone, West	Shoreditch Workhouse	13	18	31
21	BETHNAL GREEN	Green	Bethnal Green Workhouse	22	16	38
22	WHITECHAPEL	Mile End New Town	Workhouse	42	12	54
		Whitechapel, North	Workhouse	29	6	35
		Whitechapel Church	London Hospital	65	4	69
23	ST. GEORGE IN THE EAST.	St. John	Workhouse	2	10	12
24	STEPNEY	Shadwell	Shadwell Workhouse	3	9	12
		Ratcliff	Ratcliff Workhouse	–	4	4
		Mile End Old Town, Lower, &c.	Mile End Workhouse	70	5	75
			London City Workhouse	–	3	3
		Limehouse	Limehouse Workhouse	–	–	–
25	POPLAR	Bow	London City Workhouse	–	4	4
		Poplar	Poplar Workhouse	26	13	39
				1,140	280	1,420
	Districts South of the Thames:					
26	ST. SAVIOUR, SOUTHWARK.	Christ Church	St. Saviour's Workhouse	16	7	23
		St. Saviour	Guy's Hospital	45	–	45
			St. Thomas's Hospital	4	2	6
27	ST. OLAVE, SOUTHWARK.	St. Olave	Guy's Hospital	31	6	37
			St. Thomas's Hospital	59	10	69
		St. John	St. John's Workhouse	16	4	20
28	BERMONDSEY	St. Mary Magdalen	Bermondsey Workhouse	38	9	47
29	ST. GEORGE, SOUTHWARK.	Borough Road	Workhouse, Mint Street	80	20	100
30	NEWINGTON	St. Peter, Walworth	Workhouse	22	4	26
31	LAMBETH	Lambeth Church, 2d	Workhouse	59	43	102
		Norwood	Workhouse	1	3	4
32	WANDSWORTH	Battersea	Workhouse	12	5	17
33	CAMBERWELL	Camberwell	Camberwell Workhouse	68	5	73
34	ROTHERHITHE	Rotherhithe	Rotherhithe Workhouse	4	9	13
35	GREENWICH	Greenwich, West	Dreadnought Hospital	113	3	116
		Do. East	Workhouse	29	32	61
36	LEWISHAM	Lewisham Village	Workhouse	10	–	10
				607	162	769
			DISTRICTS NORTH OF THE THAMES	1,140	280	1,420
			DISTRICTS SOUTH OF THE THAMES	607	162	769
			TOTAL DISTRICTS	1,747	442	2,189

* This Workhouse belongs to the District of Westminster.

SECOND SERIES—*continued.*

TABLE VI.—MORTALITY from CHOLERA and DIARRHŒA, 1853½–54, in the SUB-DISTRICTS of LONDON. (Certain Corrections are introduced for DEATHS in HOSPITALS and WORKHOUSES.)

No. of Sub-district.	District and Sub-district.	Deaths from Cholera and Diarrhœa to 10,000 persons living.	
		Cholera.	Diarrhœa.
	1. KENSINGTON.		
	St. Mary, Paddington	2	20
2	St. John, Paddington	26	15
3	Kensington Town	49	27
4	Brompton	34	17
5	St. Peter, Hammersmith	83	12
6	St. Paul, Hammersmith	80	20
7	Fulham	59	25
	2. CHELSEA.		
1	Chelsea, South	76	24
2	Chelsea, North-west	38	24
3	Chelsea, North-east	43	27
	3. ST. GEORGE, HANOVER SQUARE.		
1	Hanover Square	12	13
2	May Fair	12	10
3	Belgrave	49	21
	4. WESTMINSTER.		
1	St. John	63	28
2	St. Margaret	54	33
	5. ST. MARTIN-IN-THE-FIELDS.		
1	Charing Cross	26	13
2	Long Acre	16	22
	6. ST. JAMES, WESTMINSTER.		
1	Berwick Street	211	16
2	St. James's Square	20	5
3	Golden Square	197	14
	7. MARYLEBONE.		
1	All Souls	13	16
2	Cavendish Square	10	10
3	Rectory	25	23
4	St. Mary	25	20
5	Christchurch	18	27
6	St. John	13	22
	8. HAMPSTEAD.		
1	Hampstead	13	11
	9. PANCRAS.		
1	Regents Park	10	15
2	Tottenham Court	17	22
3	Grays Inn Lane	6	15
4	Somers Town	11	14
5	Camden Town	7	30
6	Kentish Town	9	18
	10. ISLINGTON.		
1	Islington, West	13	22
2	Islington, East	9	21
	11. HACKNEY.		
1	Stoke Newington	11	12
2	Stamford Hill	17	25
3	West Hackney	13	15
4	Hackney	19	19
5	South Hackney	12	31
	12. ST. GILES.		
1	St. George, Bloomsbury	12	19
2	St. Giles, South	22	31
3	St. Giles, North	34	27
	13. STRAND.		
1	St. Anne, Soho	40	19
2	St. Mary-le-Strand	12	19
3	St. Clement Danes	12	24
	14. HOLBORN.		
1	St. George the Martyr	4	16
2	St. Andrew, Eastern	9	33
3	Saffron Hill	6	11
	15. CLERKENWELL.		
1	St. James	12	24
2	Amwell	11	17
3	Pentonville	9	18
4	Goswell Street	9	14
	16. ST. LUKE.		
1	Old Street	9	17
2	City Road	8	22
3	Whitecross Street	16	49
4	Finsbury	10	27
	17. EAST LONDON (CITY).		
1	St. Botolph	19	29
2	Cripplegate	23	23
	18. WEST LONDON (CITY).		
1	West London, North	5	29
2	West London, South	12	9
	19. LONDON CITY.		
1	London City, South-west	18	10
2	London City, North-west	7	8
3	London City, South	18	9
4	London City, South-east	24	10
5	London City, North-east	8	16

SECOND SERIES—*continued.*

TABLE VI.—Mortality from Cholera and Diarrhœa, 1853-4, in the Sub-Districts of London, &c.—*continued.*

No. of Sub-district.	District and Sub-district.	Deaths from Cholera and Diarrhœa to 10,000 persons living.	
		Cholera.	Diarrhœa.
	20. SHOREDITCH.		
1	Holywell	41	25
2	St. Leonard	57	29
3	Hoxton New Town	8	22
4	Hoxton Old Town	14	30
5	Haggerstone, West	12	25
6	Haggerstone, East	15	16
	21. BETHNAL GREEN.		
1	Hackney Road	27	18
2	Green	27	30
3	Church	16	18
4	Town	24	23
	22. WHITECHAPEL.		
1	Artillery	46	22
2	Spitalfields	40	26
3	Mile End New Town	50	32
4	Whitechapel, North	25	28
5	Whitechapel Church	21	16
6	Goodmans Fields	38	29
7	Aldgate	107	34
	23. ST. GEORGE-IN-THE-EAST.		
1	St. Mary	34	20
2	St. Paul	41	20
3	St. John	33	53
	24. STEPNEY.		
1	Shadwell	69	37
2	Ratcliff	64	28
3	Mile End Old Town, Upper	16	22
4	Mile End Old Town, Lower	26	33
5	Limehouse	50	19
	25. POPLAR.		
1	Bow	44	26
2	Poplar	42	25
	26. ST. SAVIOUR, SOUTHWARK.		
1	Christchurch	75	29
2	St. Saviour	208	73
	27. ST. OLAVE, SOUTHWARK.		
1	St. Olave	163	26
2	St. John, Horsleydown	110	14
	28. BERMONDSEY.		
1	St. James	201	29
2	St. Mary Magdalen	169	47
3	Leather Market	179	44
	29. ST. GEORGE, SOUTHWARK.		
1	Kent Road	142	37
2	Borough Road	167	47
3	London Road	71	21
	30. NEWINGTON.		
1	Trinity, Newington	115	32
2	St. Peter, Walworth	136	34
3	St. Mary	74	11
	31. LAMBETH.		
1	Waterloo Road, 1st	49	23
2	Waterloo Road, 2d	78	36
3	Lambeth Church, 1st	39	32
4	Lambeth Church, 2d	63	46
5	Kennington, 1st	135	37
6	Kennington, 2d	81	16
7	Brixton	39	15
8	Norwood	27	32
	32. WANDSWORTH.		
1	Clapham	109	21
2	Battersea	152	49
3	Wandsworth	70	34
4	Putney	18	11
5	Streatham	19	15
	33. CAMBERWELL.		
1	Dulwich	—	6
2	Camberwell	120	37
3	Peckham	101	26
4	St. George	94	28
	34. ROTHERHITHE.		
1	Rotherhithe	171	54
	35. GREENWICH.		
1	St. Paul, Deptford	43	24
2	St. Nicholas, Deptford	206	46
3	Greenwich, West	35	26
4	Greenwich, East	62	54
5	Woolwich Dockyard	12	16
6	Woolwich Arsenal	43	20
	36. LEWISHAM.		
1	Plumstead	16	22
2	Eltham	12	8
3	Lee	21	18
4	Lewisham Village	41	28
5	Sydenham	29	13

The 800 deaths from cholera in hospitals have been distributed over all the sub-districts, and where many deaths from cholera occurred in workhouses, a proportion has been distributed over the other sub-districts of the union in which the workhouse is situated; the population used for this calculation has been corrected to the middle (1st July) of 1854.

SECOND SERIES—*continued.*

TABLE VII.—Showing the AGES of those who DIED from DIARRHŒA in the NORTH and SOUTH DISTRICTS of the METROPOLIS, distinguishing Males and Females, from 1st July 1853 to 31st December 1854.

Age.	North Districts.			South Districts.			North and South Districts.			Age.
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	
0—	1,071	900	1,971	427	356	783	1,498	1,256	2,754	0—
1—	303	303	606	181	175	356	484	478	962	1—
2—	113	84	197	73	59	132	186	143	329	2—
3—	38	34	72	27	26	53	65	60	125	3—
4—	29	26	55	13	12	25	42	38	80	4—
5—	56	65	121	37	22	59	93	87	180	5—
10—	20	19	39	12	10	22	32	29	61	10—
15—	18	27	45	11	11	22	29	38	67	15—
20—	18	29	47	7	22	29	25	51	76	20—
25—	19	37	56	11	23	34	30	60	90	25—
30—	24	30	54	24	21	45	48	51	99	30—
35—	23	37	60	16	23	39	39	60	99	35—
40—	28	32	60	7	20	27	35	52	87	40—
45—	26	22	48	11	27	38	37	49	86	45—
50—	43	40	83	17	22	39	60	62	122	50—
55—	25	47	72	20	23	43	45	70	115	55—
60—	49	61	110	41	36	77	90	97	187	60—
65—	52	60	112	30	34	64	82	94	176	65—
70—	58	72	130	39	48	87	97	120	217	70—
75—	42	76	118	34	29	63	76	105	181	75—
80—	20	36	56	16	26	42	36	62	98	80—
85—	8	21	29	7	12	19	15	33	48	85—
90—	—	5	5	3	4	7	3	9	12	90—
95—	1	1	2	—	3	3	1	4	5	95—
?	—	2	2	—	—	—	—	2	2	?
Total -	2,084	2,066	4,150	1,064	1,044	2,108	3,148	3,110	6,258	

TABLE VIII.—Showing the AGES of those who DIED in LONDON from CHOLERA in the DISTRICTS NORTH and SOUTH of the THAMES, separately and collectively, between the 1st July 1853 and the 31st December 1854.

Age.	Districts North of the Thames.			Districts South of the Thames.			North and South Districts.			Age.
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.	
0—	103	104	207	87	53	140	190	157	347	0—
1—	106	85	191	159	162	321	265	247	512	1—
2—	107	102	209	159	143	302	266	245	511	2—
3—	101	80	181	126	115	241	227	195	422	3—
4—	87	53	140	115	90	205	202	143	345	4—
5—	265	223	488	292	271	563	557	494	1,051	5—
10—	136	98	234	114	104	218	250	202	452	10—
15—	95	92	187	112	123	235	207	215	422	15—
20—	160	142	302	159	203	362	319	345	664	20—
25—	180	162	342	200	223	423	380	385	765	25—
30—	194	215	409	195	266	461	389	481	870	30—
35—	214	219	433	225	276	501	439	495	934	35—
40—	199	241	440	178	239	417	377	480	857	40—
45—	193	176	359	176	188	364	359	364	723	45—
50—	160	192	352	133	167	300	293	359	652	50—
55—	129	131	260	123	169	292	252	300	552	55—
60—	104	167	271	132	177	309	236	344	580	60—
65—	81	108	189	89	129	218	170	237	407	65—
70—	50	78	128	52	99	151	102	177	279	70—
75—	22	47	69	45	74	119	67	121	188	75—
80—	13	19	32	18	29	47	31	48	79	80—
85—	1	8	9	4	15	19	5	23	28	85—
90—	—	1	1	—	3	3	—	4	4	90—
95—	—	2	2	—	—	—	—	2	2	95—
?	1	4	5	10	—	10	11	4	15	?
Total -	2,691	2,740	5,440	2,903	3,318	6,221	5,594	6,067	11,661	

TABLE IX.—Showing the DEATHS from CHOLERA and DIARRHŒA in LONDON at Twelve different AGES, in the Years 1849 and 1853½–54; also the Enumerated Population of 1841 and 1851.

Ages.	Deaths by Cholera.				Deaths by Diarrhœa.				Population.	
	1849.	1853½–54.	Total.	Mean.	Mean.	Total.	1849.	1853½–54.	1841.	1851.
All Ages	14,137	11,661	25,798	12,899	5,079	10,157	3,899	6,258	1,948,417	2,362,236
0–	1,969	2,142	4,111	2,056	3,388	6,765	2,515	4,251	231,018	293,562
5–	1,298	1,056	2,354	1,177	150	300	120	181	194,199	243,648
10–	679	452	1,131	565	50	100	39	61	178,023	216,369
15–	1,334	1,086	2,420	1,210	104	208	65	143	393,528	455,095
25–	2,036	1,637	3,673	1,837	133	277	88	189	366,416	428,123
35–	2,108	1,793	3,901	1,950	164	328	142	186	256,886	308,949
45–	1,861	1,376	3,237	1,619	172	343	135	208	166,641	208,363
55–	1,475	1,132	2,607	1,303	262	525	222	302	94,830	122,946
65–	974	686	1,660	830	353	705	311	393	48,939	62,608
75–	368	267	635	318	246	493	214	279	15,574	19,845
85–	35	32	67	33	53	106	46	60	2,218	2,578
95 & upwards	—	2	2	1	4	7	2	5	145	150

SECOND SERIES—*continued.*

TABLE X.—Showing the MEAN RATE of MORTALITY at Twelve different AGES from CHOLERA and DIARRHŒA in London in the Two Epidemics of 1849 and 1853–54.

Age.	Mean of the Deaths, in each Epidemic, to 10,000 Persons, living at each Age from	
	CHOLERA.	DIARRHŒA.
	Mean of 1849 and 1853–54.	Mean of 1849 and 1853–54.
All Ages	53·7	21·1
0—	68·8	113·3
5—	47·5	6·1
10—	25·7	2·3
15—	26·1	2·2
25—	42·2	3·2
35—	62·1	5·2
45—	76·4	8·1
55—	104·2	21·0
65—	130·3	55·3
75—	157·3	122·1
85—	127·7	202·1
95 & upwards	65·5	229·4

The Table may be read thus:—To 10,000 Persons living at the Age 25 and under 35, 42 died of Cholera and 3 in 10,000 of Diarrhœa, on an average in each epidemic; and the mortality in the *two* epidemics was at the rate of 84·4 by Cholera, and 6·4 by Diarrhœa in 10,000 of the population living at that age.

THIRD SERIES.

TABLE I.—MORTALITY from CHOLERA in the 36 Districts of LONDON during the Two Epidemics of 1849 and 1853½–1854; with the Elevation, Density, and other Conditions of the Population.

Company by which Water is chiefly supplied.	DISTRICTS.	Annual Value of Houses.	Mean Elevation in Feet (above Trinity High-water Mark.)*	Area in Acres.	Population, 1851.	Density (1851). Persons to an Acre.	Mortality from Cholera to every 10,000 Inhabitants. In the Year 1849.	Mortality from Cholera to every 10,000 Inhabitants. In the Years 1853½ to end of 1854.	Mortality from Diarrhœa to every 10,000 Inhabitants. In the Year 1849.	Mortality from Diarrhœa to every 10,000 Inhabitants. In the Years 1853½ to end of 1854.
		£.								
	LONDON	40	39	78,029	2,362,236	30	62	46	17	25
J. W.	Kensington HL	43	40	7,374 *w*	120,004	16	24	38	13	20
C.	Chelsea *WH*	29	12	865 *w*	56,538	65	46	51	17	25
J. C.	St. George, Hanover Sq. H	110	34	1,161 *w*	73,230	63	18	33	10	17
C.	Westminster HHPP	36	3	917 *w*	65,609	72	68	57	17	30
N.	St. Martin in the Fields. H	119	38	305 *w*	24,640	81	37	20	11	17
J. N.	St. James, Westminster	128	58	164	36,406	222	16	142	11	12
W.	Marylebone H	71	87	1,509	157,696	105	17	17	15	21
N. W.	Hampstead	40	350	2,252	11,986	5	8	12	10	11
N. H. W.	Pancras *WHH*	41	73	2,716	166,956	61	22	10	14	19
N.	Islington HHPP	35	94	3,127	95,329	30	22	11	13	22
N. E.	Hackney H	25	53	3,929	58,429	15	25	15	17	20
N.	St. Giles	60	68	245	54,214	221	53	22	14	26
N.	Strand H	66	50	174 *w*	44,460	256	35	22	14	21
N.	Holborn	52	53	196	46,621	238	35	6	12	20
N.	Clerkenwell PP	33	65	380	64,778	170	19	10	14	19
N.	St. Luke L	28	51	220	54,055	246	34	10	18	29
N. E.	East London P	38	40	153	44,406	290	45	†23	13	26
N.	West London *WHPPP*‡	65	29	136 *w*	28,790	212	96	†10	22	18
N.	City of London	117	31	434 *w*	55,932	129	38	†14	8	11
N. E.	Shoreditch *WL*	20	48	646	109,257	169	76	23	18	25
E.	Bethnal Green L	9	38	760	90,193	119	90	23	24	23
E.	Whitechapel H	26	32	406 *w*	79,759	196	64	45	20	27
E.	St. George in the East	32	21	243	48,376	199	42	36	15	31
E.	Stepney H	20	21	1,257 *w*	110,775	88	47	38	17	27
E.	Poplar *WL*	44	8	2,918 *w*	47,162	16	71	42	17	25
S. L.	St. Saviour, Southwk. HH	36	3	250 *w*	35,731	143	153	142	32	53
S. L.	St. Olave, Southwk. HH	35	4	169 *w*	19,375	115	181	140	25	19
S.	Bermondsey	18	0	688 *w*	48,128	70	161	179	33	39
S. L.	St. George, Southwk. LLP	22	0	282	51,821	184	164	121	25	34
L. S.	Newington P	22	−1	624	64,816	104	144	112	21	29
L. S.	Lambeth	28	3	4,015 *w*	139,325	35	120	70	20	31
S.	Wandsworth L	29	24	11,695 *w*	50,764	4	100‡	85	15	28
S. L.	Camberwell LL	25	4	4,342	54,667	13	97	99	17	30
S. K.	Rotherhithe	23	0	886 *w*	17,805	21	205	165	26	54
K.	Greenwich HHHP	22	8	5,367 *w*	99,365	19	75	49	21	29
K. L.	Lewisham *W*	27	28	17,224 *w*	34,835	2	30	22	17	20

* The Elevation of the Districts has been deduced for these new Tables by multiplying the "numbers of the population" returned at the Census of 1851 into the "elevation" of each Sub-District, and dividing the sum of these by the population of the District. Thus the mean elevation of the ground on which the population resides is found with tolerable accuracy. The elevation for the Districts of Lambeth, Greenwich, and Lewisham is taken from a Return furnished by Colonel Dawson.

† The three districts of the City of London, the East London, and the West London, including St. Bartholomew's Hospital, comprise the City of London, within and without the walls. Mr. Simon, the health officer of the City, has ascertained that the deaths from cholera properly belonging to these districts were 213, 197, 278 in 1849, and 79, 104, and 29 in 1853½; his numbers have been adopted in the calculations. A similar correction is required of the mortality of St. Olave's district, where many persons from other districts died of cholera in St. Thomas's Hospital.

‡ Excluding the deaths which occurred in Dronet's Asylum for Infant Paupers, the mortality of the Wandsworth District was at the rate of 72 deaths to 10,000 persons living.

** The areas marked thus (*w*) include portions of the River Thames.

The several Water Companies are designated by letters:—thus, the New River Company by N; the Grand Junction by J; Chelsea by C; West Middlesex by W; East London by E; Hampstead by H; Southwark by S; Lambeth by L; and Kent by K.

THIRD SERIES—*continued.*

TABLE II.—MEAN ELEVATION and MEAN MORTALITY by CHOLERA and DIARRHŒA in LONDON DISTRICTS of different Degrees of DENSITY.

Density. Persons to an Acre.	Mean Elevation in Feet.	Mean Mortality to 10,000 Persons.	
		Cholera.	Diarrhœa.
1 — 10	66	37	21
10 — 30	30	50	26
30 — 50	15	71	23
50 — 100	33	53	25
100 — 150	22	64	28
150 — 200	40	42	21
200 — 250	42	34	23
250 — 300	44	27	25
300 — 400	57	28	24
400 and ups.*	56	80	33

The Table may be read thus : — In districts containing 50 and under 100 persons to an acre, the mean elevation is 33 feet, and the mean mortality by Cholera was 53 in 10,000; by Diarrhœa 25 in 10,000 in London in the one and a half years 1853½–1854.

* Including the sub-districts of Whitecross Street, St. Andrew Eastern, and Berwick Street, St. James's, to the latter of which exclusively the high mortality is due.

THIRD SERIES—*continued.*

TABLE III.—Of the SUB-DISTRICTS of LONDON arranged according to the DENSITY of the POPULATION, with the MEAN ELEVATION above TRINITY HIGH-WATER MARK, and MORTALITY from CHOLERA in the 1½ years 1853½–1854.

SUB-DISTRICTS.	DISTRICTS.	Density. Persons to an Acre.	Elevation in Feet.	Mortality by Cholera and Diarrhœa in the 1½ years 1853½–1854 to 10,000 persons living.	
				Cholera.	Diarrhœa.
Dulwich L	Camberwell	1	68	–	6
Eltham	Lewisham	1	?	12	8
Putney	Wandsworth	2	12	18	11
Sydenham	Lewisham	2	188	29	13
Lewisham Village *Ww*	Lewisham	2	16	41	28
Plumstead	Lewisham	3	?	16	22
Streatham L	Wandsworth	3	72	19	15
Lee	Lewisham	4	42	21	18
Norwood *W* L	Lambeth	4	128	27	32
Wandsworth P	Wandsworth	4	12	70	34
Hampstead *W*	Hampstead	5	350	13	11
Battersea *W*	Wandsworth	5	3	152	49
Hammersmith, St. Paul	Kensington	6	8	80	20
Fulham *w* L	Kensington	6	6	59	25
Stoke Newington	Hackney	8	72	11	12
Stamford Hill	Hackney	9	76	17	25
Brixton	Lambeth	10	58	39	15
Greenwich, East *W*	Greenwich	10	7	62	54
Hackney *W*	Hackney	12	44	19	19
Clapham	Wandsworth	13	21	109	21
Bow *w*	Poplar	13	15	44	26
Camberwell *W*	Camberwell	13	5	120	37
Kentish Town	Pancras	14	110	9	18
Woolwich Arsenal P	Greenwich	14	?	43	20
St. Paul, Deptford	Greenwich	15	10	45	24
Peckham	Camberwell	17	4	101	26
South Hackney	Hackney	18	44	12	31
Poplar *W*	Poplar	19	3	42	25
Rotherhithe *W*	Rotherhithe	20	0	171	54
Paddington, St. Mary *W*	Kensington	21	82	2	20
Brompton H	Kensington	21	12	34	17
Hammersmith, St. Peter	Kensington	22	4	83	12
Kensington Town *WL*	Kensington	23	28	40	27
Islington East	Islington	25	88	9	21
LONDON	LONDON	30	39	46	25
Woolwich Dockyard	Greenwich	35	?	12	16
Kennington, 2d part	Lambeth	37	8	81	16
St. George	Camberwell	37	–3	94	28
Islington West *WHHP*	Islington	39	100	13	22
West Hackney	Hackney	40	55	18	15
St. James	Bermondsey	42	–1	201	29
Hanover Square	St. George, Hanover Square	45	64	12	13
St. Nicholas, Deptford	Greenwich	47	4	206	46
Charing Cross *WH*	St. Martin-in-the-Fields	48	17	26	13
St. Margaret *WHP*	Westminster	48	4	54	33
Chelsea, South	Chelsea	52	10	76	24
Kennington, 1st part	Lambeth	53	4	135	37
St. John	Marylebone	55	124	18	22
Mile End Old Town, Lower *W*	Stepney	55	28	26	33
Greenwich, West P	Greenwich	58	12	35	26
Green *W*	Bethnal Green	60	36	27	30
Paddington, St. John H	Kensington	65	76	26	15
Christchurch	Marylebone	65	92	18	27
Belgrave H	St. George, Hanover Square	69	12	49	21
Chelsea, North-east L	Chelsea	70	13	48	27
Regent's Park	Pancras	75	87	10	15
Chelsea, North-west *Ww*	Chelsea	83	12	38	24
Limehouse *W*	Stepney	86	10	50	19
St. Mary	Newington	87	–1	74	11
Pentonville	Clerkenwell	89	84	9	18
Lambeth Church, 1st part	Lambeth	89	2	39	32
Shadwell *W*	Stepney	90	7	69	37
Haggerstone, East	Shoreditch	91	52	15	16
St. Peter, Walworth *W*	Newington	93	–2	136	34
May Fair *W*	St. George, Hanover Square	95	56	12	10
St. Mary Magdalen *W*	Bermondsey	98	0	169	47
Aldgate	Whitechapel	99	10	107	34

THIRD SERIES—*continued.*

TABLE III.—Of the Sub-Districts of London, &c.—*continued.*

SUB-DISTRICTS.	DISTRICTS.	Density. Persons to an Acre.	Elevation in Feet.	Mortality by Cholera and Diarrhœa in the 1½ Years 1853½–1854 to 10,000 persons living.	
				Cholera.	Diarrhœa.
City of London, South-east -	City of London - -	103	21	24	10
St. John *W* - - -	St. George-in-the-East -	103	2	33	53
St. Olave H - - -	St. Olave, Southwark -	107	6	163	26
City of London, South -	City of London - -	115	21	18	9
Ratcliff *W* - - -	Stepney - - -	115	18	64	28
St. John, Horsleydown *W* -	St. Olave, Southwark -	121	2	140	14
Camden Town *W* - -	Pancras - - -	123	62	7	30
St. Saviour H - -	St. Saviour, Southwark	127	4	208	73
Waterloo Road, 2d part -	Lambeth - - -	129	2	78	36
Cavendish Square - -	Marylebone - - -	130	73	10	10
St. John HP - - -	Westminster - -	132	2	63	28
City of London, South-west -	City of London - -	137	21	18	10
St. George, Bloomsbury -	St. Giles - - -	138	71	12	19
City of London, North-east -	City of London - -	139	44	8	16
Lambeth Church, 2d part *W*	Lambeth - - -	144	1	63	46
Trinity P - - - -	Newington - - -	147	-1	115	32
Hoxton Old Town - -	Shoreditch - - -	150	52	14	30
Haggerstone, West *W* -	Shoreditch - - -	154	52	12	25
Mile End Old Town, Upper -	Stepney - - -	155	32	16	22
Waterloo Road, 1st part -	Lambeth - - -	155	3	49	25
London Road - - -	St. George, Southwark -	159	0	71	21
City of London, North-west -	City of London - -	165	44	7	8
Church - - - -	Bethnal Green - -	165	36	16	18
Golden Square *W* - -	St. James, Westminster -	166	68	197	14
Leather Market - -	Bermondsey - - -	166	0	179	44
Whitechapel Church H -	Whitechapel - - -	166	32	21	16
Christchurch *W* - - -	St. Saviour, Southwark -	169	2	75	29
Hackney Road - - -	Bethnal Green - -	170	44	27	18
Gray's Inn Lane H -	Pancras - - -	171	52	6	15
St. Mary-le-Strand - -	Strand - - -	173	48	12	19
Kent Road - - -	St. George, Southwark -	173	-1	142	37
Goswell Street - - -	Clerkenwell - - -	174	78	9	14
West London, South - -	West London - - -	178	24	12	9
Hoxton New Town *w* -	Shoreditch - - -	181	52	8	22
St. George-the-Martyr -	Holborn - - -	183	66	4	16
Amwell P - - -	Clerkenwell - - -	192	68	11	17
Somer's Town - - -	Pancras - - -	194	60	11	14
Tottenham Court *w*H -	Pancras - - -	196	73	17	22
Old Street - - -	St. Luke - - -	204	60	9	17
St. Mary - - - -	Marylebone - - -	211	79	25	20
St. James's Square - -	St. James, Westminster -	212	40	20	5
Whitechapel, North *W* -	Whitechapel - - -	216	36	25	28
Town - - - -	Bethnal Green - -	218	36	24	23
City Road - - -	St. Luke - - -	219	52	8	22
Finsbury - - -	St. Luke - - -	223	43	10	27
Mile End New Town *W* -	Whitechapel - - -	227	36	50	32
Saffron Hill - - -	Holborn - - -	231	40	6	11
Goodman's Fields - -	Whitechapel - - -	237	28	38	29
Rectory *W* - - -	Marylebone - - -	238	68	25	23
St. Paul - - - -	St. George-in-the-East -	242	26	41	20
Borough Road *W*P - -	St. George, Southwark -	244	2	167	47
Holywell - - -	Shoreditch - - -	254	36	41	25
All Souls H - - -	Marylebone - - -	258	76	13	16
St. Leonard - - -	Shoreditch - - -	259	41	57	29
Artillery - - - -	Whitechapel - - -	271	36	46	22
West London, North *W w*HP	West London - - -	275	36	5	29
St. Botolph *W* - -	East London - - -	280	36	19	29
Long Acre - - -	St. Martin-in-the-Fields -	287	60	16	22
St. Clement Danes H -	Strand - - - -	287	36	12	24
Spitalfields - - -	Whitechapel - - -	289	36	40	26
St. Giles, North - -	St. Giles - - -	291	70	34	27
St. Mary - - - -	St. George-in-the-East -	291	26	34	29
St. James *W* - - -	Clerkenwell - - -	291	44	12	24
Cripplegate P - - -	East London - - -	303	44	23	23
St. Giles, South *W* - -	St. Giles - - -	317	64	22	31
St. Anne, Soho - - -	Strand - - - -	327	64	40	19
Whitecross Street - -	St. Luke - - -	414	52	16	40
St. Andrew, Eastern *W* -	Holborn - - -	423	50	9	33
Berwick Street - - -	St. James, Westminster -	432	65	211	16

NOTE.—The letters placed against the names of the sub-districts denote public institutions within their limits; namely, H, for hospital; L, lunatic asylum; P, prison; *W*, workhouse.

THIRD SERIES—*continued.*

TABLE IV.—Of MORTALITY from CHOLERA in the 1½ years 1853½–1854, and the Number of PERSONS to an ACRE, in the SUB-DISTRICTS of LONDON, arranged in the order of the ELEVATION of the GROUND above Trinity High-water Mark.

SUB-DISTRICTS.	Elevation in Feet above Trinity High-water Mark.	Density. Persons to an Acre.	Mortality by Cholera and Diarrhœa in the 1½ Years 1853½–1854 to 10,000 persons living.	
			Cholera.	Diarrhœa.
Hampstead *W* - - - -	350	5	13	11
Sydenham - - - -	188?	2	29	13
Norwood *W* (L) - - -	128?	4	27	32
St. John [Marylebone] - - -	124	55	13	22
Kentish Town - - -	110	14	9	18
Islington West *WHHP* - -	100	39	13	22
Christchurch [Marylebone] - -	92	65	18	27
Islington, East - - - -	88	25	9	21
Regent's Park [Pancras] - -	87	75	10	15
Pentonville - - - -	84	89	9	18
Paddington, St. Mary *W* - -	82	21	2	20
St. Mary [Marylebone] - - -	79	211	25	20
Goswell Street [Clerkenwell] - -	78	174	9	14
Stamford Hill [Hackney] - -	76	9	17	25
Paddington, St. John H - - -	76	65	26	15
All Souls [Marylebone] H - -	76	258	13	16
Cavendish Square - - -	73	130	10	10
Tottenham Court [Pancras] *w*H -	73	196	17	22
Stoke Newington - - -	72	8	11	12
Streatham (L) - - - -	72	3	19	15
St. George, Bloomsbury - - -	71	138	12	19
St. Giles, North - - - -	70	291	34	27
Dulwich (L) - - - -	68	1	—	6
Amwell [Clerkenwell] P - -	68	192	11	17
Golden Square [St. James, Westminster] *W.*	68	166	197	14
Rectory [Marylebone] *W* - -	68	238	25	23
St. George-the-Martyr [Holborn] -	66	183	4	16
Berwick Street [St. James, Westminster].	65	432	211	16
Hanover Square - - - -	64	45	12	13
St. Anne, Soho - - - -	64	327	40	19
St. Giles, South *W* - - -	64	317	22	31
Camden Town *W* - - -	62	123	7	30
Somer's Town - - - -	60	194	11	14
Old Street [St. Luke] - - -	60	204	9	17
Long Acre - - - -	60	287	16	22
May Fair *W* - - - -	56	95	12	10
Brixton - - - - -	56	10	39	15
West Hackney - - - -	55	40	13	15
Hoxton Old Town - -	52	150	14	30
Haggerstone, East - - -	52	91	15	16
City Road [St. Luke] - - -	52	219	8	22
Gray's Inn Lane [Pancras] H - -	52	171	6	15
Whitecross Street [St. Luke] - -	52	414	16	49
Hoxton New Town *w* - - -	52	181	8	22
Haggerstone, West *W* - - -	52	154	12	25
St. Andrew, Eastern [Holborn] *W* -	50	423	9	33
St. Mary-le-Strand - - -	48	173	12	19
City of London, North-west - -	44	165	7	8
South Hackney - - - -	44	18	12	31

THIRD SERIES—*continued.*

TABLE IV.—Of Mortality from Cholera, &c.—*continued.*

SUB-DISTRICTS.	Elevation in Feet above Trinity High-water Mark.	Density. Persons to an Acre.	Mortality by Cholera and Diarrhœa in the 1½ Years 1853½–1854 to 10,000 persons living. Cholera.	Diarrhœa.
St. James, [Clerkenwell] *W*	44	291	12	24
City of London, North-east	44	139	8	16
Hackney *W*	44	12	19	19
Cripplegate [East London] P	44	303	23	23
Hackney Road [Bethnal Green]	44	170	27	18
Finsbury	43	223	10	27
Lee	42	4	21	18
St. Leonard [Shoreditch]	41	259	57	29
St. James's Square [St. James, Westminster].	40	212	20	5
Saffron Hill [Holborn]	40	231	6	11
LONDON	39	30	46	25
Artillery [Whitechapel]	36	271	46	22
Church [Bethnal Green]	36	165	16	18
St. Botolph [East London] *W*	36	280	19	29
St. Clement Danes H	36	287	12	24
Mile End New Town *W*	36	227	50	32
Spitalfields	36	289	40	26
West London, North *WwHP*	36	275	5	29
Whitechapel, North *W*	36	216	25	28
Green [Bethnal Green] *W*	36	60	27	30
Town [Bethnal Green]	36	218	24	23
Holywell [Shoreditch]	36	254	41	25
Mile End Old Town, Upper	32	155	16	22
Whitechapel Church H	32	166	21	16
Goodman's Fields	28	237	38	29
Mile End Old Town, Lower *W*	28	55	26	33
Kensington Town *WL*	28	23	49	27
St. Mary [St. George in the East]	26	291	34	29
St. Paul [St. George in the East]	26	242	41	20
West London, South	24	178	12	9
City of London, South-west	21	137	18	10
City of London, South	21	115	18	9
City of London, South-east	21	103	24	10
Clapham	21	13	109	21
Aldgate	19	99	107	34
Ratcliff *W*	18	115	64	28
Charing Cross *WH*	17	48	26	13
Lewisham Village *Ww*	16	2	41	28
Bow *w*	15	13	44	26
Chelsea, North-east L	13	70	43	27
Chelsea, North-west *Ww*	12	83	38	24
Belgrave [St. George, Han. Square.] H	12	69	49	21
Greenwich, West P	12	58	35	26
Brompton H	12	21	34	17
Wandsworth P	12	4	70	34
Putney	12	2	18	11
Chelsea, South	10	52	76	24
St. Paul, Deptford	10	15	45	24
Limehouse *W*	10	86	50	19
Hammersmith, St. Paul	8	6	80	20
Kennington, 2d	8	37	81	16
Shadwell *W*	7	90	69	37

THIRD SERIES—*continued.*

TABLE IV.—Of Mortality from Cholera, &c.—*continued.*

SUB-DISTRICTS.	Elevation in Feet above Trinity High-water Mark.	Density. Persons to an Acre.	Mortality by Cholera and Diarrhœa in the 1½ Years 1853½–1854 to 10,000 persons living. Cholera.	Diarrhœa.
Greenwich, East *W*	7	10	62	54
Fulham *w* L	6	6	59	25
St. Olave, Southwark H	6	107	163	26
Camberwell *W*	5	13	120	37
Hammersmith, St. Peter	4	22	83	12
Peckham	4	17	101	26
St. Nicholas, Deptford	4	47	206	46
St. Margaret, Westminster *WHP*	4	48	54	33
Kennington, 1st	4	53	135	37
St. Saviour, Southwark H	4	127	208	73
Battersea *W*	3	5	152	49
Poplar *W*	3	19	42	25
Waterloo Road, 1st	3	155	49	23
St. John [St. George-in-the-East] *W*	2	103	33	53
St. John [Westminster] *HP*	2	132	63	28
Lambeth Church, 1st	2	89	39	32
Waterloo Road, 2d	2	129	78	36
Christchurch [Southwark] *W*	2	169	75	29
St. John, Horsleydown *W*	2	121	140	14
Borough Road *WP*	2	244	167	47
Lambeth Church, 2d W	1	114	63	46
London Road [St. George, Southwark]	0	159	71	21
Rotherhithe *W*	0	20	171	54
Leather Market [Bermondsey]	0	166	179	44
St. Mary Magdalen [Bermondsey] *W*	0	98	169	47
St. Mary [Newington]	–1	87	74	11
St. James [Bermondsey]	–1	42	201	29
Trinity [Newington] P	–1	147	115	32
Kent Road	–1	173	142	37
St. Peter, Walworth *W*	–2	93	136	34
St. George [Camberwell]	–3	37	94	28

NOTE.—The letters placed against names of sub-districts denote public institutions within their limits; *W* stands for workhouse; H, for hospital; L, lunatic asylum; P, prison; *w* indicates a workhouse not belonging to the district, though situated therein.

A *minus* sign (–) before the figures indicates that the level is *below* Trinity High-water Mark.

The elevation of Eltham, Plumstead, Woolwich Dockyard, and Woolwich Arsenal has not been determined, the mortality from Cholera in 1853½ to 1854 was respectively 12, 16, 12, and 43 to every 10,000 inhabitants, and the mortality from Diarrhœa was respectively 8, 22, 16, and 20.

THIRD SERIES—*continued.*

TABLE V.—Showing the MORTALITY by CHOLERA in 1849 and in the 1½ years 1853½–1854 of FOURTEEN SECTIONS of the POPULATION of LONDON living in SUB-DISTRICTS at FOURTEEN different STAGES of ELEVATION; also other CONDITIONS.

Annual Value of Houses.	Elevation in Feet above Trinity High-water Mark of the Thames.	Density. Persons to an Acre in 1851.	Annual Rate of Increase per Cent. on Population 1841–51.	Mortality by Cholera and Diarrhœa 1853½–1854. Deaths to 10,000 Persons. Cholera.	Diarrhœa.	Cholera and Diarrhœa.	Mortality by Cholera. In 1849.	Mean in the two Epidemics.
£	Feet. Feet.							
40	100 — 350	13	5·761	13	21	34	12	13
71	90 — 100	65	1·634	18	27	45	10	14
38	80 — 90	33	4·161	8	19	27	23	16
48	70 — 80	33	·883	19	18	37	25	22
70	60 — 70	79	·901	36	20	56	26	31
36	50 — 60	67	2·607	13	22	35	45	29
53	40 — 50	37	·885	20	20	40	44	32
27	30 — 40	170	1·207	25	25	50	77	51
60	20 — 30	48	1·963	40	23	63	48	44
40	10 — 20	19	2·709	50	24	74	60	55
28	Under 10, viz.:	32	1·958	104	35	139	121	113
31	5 — 10	13	2·040	85	31	116	91	88
32	3 — 5	24	2·182	103	36	139	87	95
31	1 — 3	132	1·326	78	35	113	138	108
21	−3 — 1	64	2·264	137	34	171	153	145
41	Total of London	30	1·982	46	25	71	62	54

TABLE VI.—Showing the MORTALITY by CHOLERA in 1849 and in the 1½ years 1853½–1854 of SIX PORTIONS of the POPULATION of LONDON living in SUB-DISTRICTS at Six different Elevations; and other Conditions.

No. of Sub-Districts.	Elevation above Trinity High-water Mark of the Thames. Extreme Elevation of Sub-districts.	Mean.	Density. Persons to an Acre in 1851.	Annual Value of Houses.	Annual Rate of Increase per Cent. on Population 1841–51.	Mortality by Cholera and Diarrhœa 1853½–1854. Deaths to 10,000 Persons living. Cholera.	Diarrhœa.	Cholera and Diarrhœa.	Mortality by Cholera. Deaths to 10,000 persons living. In 1849.	Mean in the two Epidemics.
	Feet. Feet.	Feet.		£						
6	100 — 350	137	13	40	5·761	13	21	34	12	13
5	80 — 100	88	37	45	3·496	10	21	31	20	15
24	60 — 80	69	48	60	·893	28	19	47	25	26
24	40 — 60	48	47	45	1·689	17	21	38	45	31
23	20 — 40	31	81	41	1·527	32	24	56	65	49
40	Under 20	5	27	32	2·178	88	31	119	103	96
ALL LONDON	3 ft. below to 350 feet above	39	30	41	1·982	46	25	71	62	54
1	2	3	4	5	6	7	8	9	10	11

The column 2 shows that the mean elevation of the sub-districts ranges between 100 feet and 350 feet; and the 3d column, that upon multiplying the population of each sub-district into its elevation, and dividing all the sums thus obtained by the sum of the population, the mean elevation at which the people lived in the six highest sub-districts is about 137 feet.

THIRD SERIES—*continued.*

TABLE VII.—Of the PRINCIPAL FACTS from which the RESULTS in Tables V. and VI. were obtained.

Elevation above Trinity High-water Mark of the Thames.	Area.	Population.		Deaths from Cholera and Diarrhœa, 1853½–1854.		
		1841.	1851.	Cholera.	Diarrhœa.	Cholera and Diarrhœa.
Feet. Feet.	Acres.					
100 — 350	9,341	70,119	121,497	194	299	493
90 — 100	518	28,911	33,895	64	98	162
80 — 90	3,287	72,740	108,523	98	239	337
70 — 80	5,919	177,169	193,128	373	360	733
60 — 70	2,844	206,640	225,663	835	455	1,290
50 — 60	2,854	147,501	189,876	273	463	736
40 — 50	5,303	181,400	197,791	410	405	815
30 — 40	1,311	197,680	222,386	573	581	1,154
20 — 30	3,523	140,510	170,051	726	408	1,134
10 — 20	13,637	197,082	256,182	1,935	660	2,045
Under 10, viz.:*	18,429	492,000	595,119	6,609	2,187	8,796
5 — 10	7,742	88,820	102,191	933	342	1,275
3 — 5	6,693	128,890	159,298	1,764	619	2,383
1 — 3	1,145	132,745	151,070	1,226	558	1,784
−3 — 1	2,849	146,545	182,560	2,686	668	3,354
	67,026	1,911,761	2,314,110	11,540	6,155	17,695
Elevations not stated	11,003	33,566	48,126	121	103	224
Police on duty	—	3,090	—	—	—	—
Total	78,029	1,948,417	2,362,236	11,661	6,258	17,919

* The numbers in this line are the sums of the numbers in the four lines below. The last line (−3—1) is to be read thus: the mean elevations of the lowest sub-districts range from three feet below to one foot above Trinity High-water Mark.

TABLE VIII.—Estimated Number of CASES of CHOLERA and DIARRHŒA in London in the year and half, July 1st, 1853, to the end of 1854; also the Deaths registered.

Ages.	Cholera and Diarrhœa.		Cholera.		Diarrhœa.	
	Cases (estimated).	Deaths (registered).	Cases (estimated).	Deaths (registered).	Cases (estimated).	Deaths (registered).
0—	74,424	6,393	3,465	2,142	70,959	4,251
5—	15,210	1,237	2,178	1,056	13,032	181
10—	6,173	513	968	452	5,205	61
15—	13,356	1,229	3,108	1,086	10,248	143
25—	38,228	1,826	4,624	1,637	33,604	189
35—	74,001	1,979	4,127	1,793	69,874	186
45—	46,687	1,584	2,747	1,376	43,940	208
55—	54,953	1,434	2,103	1,132	52,850	302
65—	13,302	1,079	1,179	686	12,123	393
75—	10,617	546	374	267	10,243	279
85 and upwards	7,744	99	44	34	7,700	65
All ages	354,695	17,919	24,917	11,661	329,778	6,258

THIRD SERIES—*continued.*

TABLE IX.— Showing the PROBABILITY of RECOVERING and of DYING at different PERIODS of CHOLERA (deduced from the Medical Returns).

Time from Commencement.	Remaining in the Period following.	To Recover.	To Die.	Terminating in the period indicated in Column 1.	Recovering.	Dying.
Hours.						
0—	3,600	1,856	1,744	106	31	75
6—	3,494	1,825	1,669	347	32	315
12—	3,147	1,793	1,354	274	17	257
18—	2,873	1,776	1,097	89	2	87
Days.						
0—	3,600	1,856	1,744	816	82	734
1—	2,784	1,774	1,010	590	162	428
2—	2,194	1,612	582	403	217	186
3—	1,791	1,395	396	342	236	106
4—	1,449	1,159	290	271	197	74
5—	1,178	962	216	185	143	42
6—	993	819	174	163	122	41
7—	830	697	133	30	20	10
8—	800	677	123	28	20	8
9—	772	657	115	27	21	6
10—	745	636	109	25	20	5
11—	720	616	104	24	19	5
12—	696	597	99	22	18	4
13—	674	579	95	21	17	4
14—	653	562	91	89	59	30
15—	564	503	61	78	59	19
16—	486	444	42	76	66	10
17—	410	378	32	69	62	7
18—	341	316	25	65	60	5
19—	276	256	20	60	56	4
20—	216	200	16	51	48	3
21—	165	152	13	30	28	2
22—	135	124	11	23	21	2
23—	112	103	9	17	16	1
24—	95	87	8	15	14	1
25—	80	73	7	12	11	1
26—	68	62	6	10	9	1
27—	58	53	5	10	9	1
28—	48	44	4	10	9	1
29—	38	35	3	9	8	1
30—	29	27	2	9	8	1
31—	20	19	1	8	7	1
32—	12	12	0	6	6	0
33—	6	6	0	4	4	0
34—	2	2	0	2	2	0
1	2	3	4	5	6	7

The Table may be read thus:—By the Medical Returns of 3,600 persons that are attacked by Cholera, 1,856 ultimately recover, 1,744 die; 816 terminate on the first day, 82 by recovery, 734 by death, leaving 2,784 to enter the second day, of whom 1,774 will recover, 1,010 will die, &c.

The cols. 2, 3, 4, it will be observed, are derived from the first numbers at their head by the successive subtraction of the numbers furnished by the returns in cols. 5, 6, 7.

THIRD SERIES—*continued.*

TABLE X.—DAILY RATE of RECOVERY and MORTALITY at different PERIODS of CHOLERA.

Day of the Disease.	To 100 Patients living at each period, the Number of Cases		
	Daily Terminating.	Daily Recovering.	Daily Dying.
Days.			
0 — 1	26	3	23
1 — 2	24	7	17
2 — 3	20	11	9
3 — 4	21	14	7
4 — 5	21	15	6
5 — 6	17	13	4
6 — 7	18	13	5
7 — 8	4	3	1
8 — 9	4	3	1
9 — 10	4	3	1
10 — 11	3	2	1
11 and up.	11	10	1

The Table may be read thus:—To every 100 patients in the *first day* of the disease, 3 recoveries, 23 deaths took place; to every 100 patients in the *second day* of the disease 7 recoveries, 17 deaths took place. Thus the rate of mortality was highest on the first and second days; and the rate of recovery was highest on the fifth day (4–5.) If there were 12 hospitals, each containing 100 beds, constantly occupied by patients in the first, second, third, &c. day of the disease, there would be 3 recoveries, 23 deaths in the first, &c.

THIRD SERIES—*continued.*

TABLE XI.—Showing the PROBABILITY of RECOVERING or DYING from an Attack of CHOLERA at different PERIODS of the DISEASE.

Time from Commencement.	Probability of ultimately	
	Recovering.	Dying.
Hours.		
0—	·5156	·4844
6—	·5223	·4777
12—	·5698	·4302
18—	·6182	·3818
Days.		
0—	·5156	·4844
1—	·6372	·3628
2—	·7347	·2653
3—	·7789	·2211
4—	·7999	·2001
5—	·8166	·1834
6—	.8248	·1752
7—	·8398	·1602
8—	·8463	·1537
9—	·8510	·1490
10—	·8537	·1463
11—	·8556	·1444
12—	·8578	·1422
13—	·8591	·1409
14—	·8606	·1394
15—	·8918	·1082
16—	·9136	·0864
17—	·9220	·0780
18—	·9267	·0733
19—	·9275	.0725
20—	·9259	·0741
21—	·9212	·0788

The Table may be read thus :—The average probability that a patient who has lived two complete days (48 hours) from the commencement of the attack of cholera will ultimately recover, is ·7347; or it is 7347 to 2653 in favour of his recovery.

No. III.

Summary Table of Houses, Population, and Mortality, in the Golden Square Districts.

(*Prepared by* Mr. H. EDWARDS, *from the Registrar-General's Returns.*)

SUMMARY TABLE showing the HOUSES, POPULATION, and DEATHS from all Causes, from Zymotic Diseases, and from Cholera especially, in each Street, Court, &c., in the Registrar's Districts of St. Ann's, Soho, Berwick Street, and Golden Square, during the Seven Years 1848–1854, both inclusive.

Name of Street, Court, &c.	Population of Street, 1851.	Total No. of Houses in Street.	Number of HOUSES in which Deaths have occurred during the seven years 1848—1854,			Number of DEATHS during the seven years 1848–1854,				Total Cholera Deaths in the Epidemic of 1853-4.	Number of HOUSES in which *Deaths* from *Cholera* occurred in the periods 1848-52, and 1848-9.		
							From ZYMOTIC DISEASES.						
			From All Causes.	From Zymotic Diseases.		From All Causes.	Exclusive of Cholera.	From *Cholera* alone.					
				Exclusive of Cholera.	Cholera.			In Houses where other Zymotic Deaths have occurred.	In Houses where no other Zymotic Deaths have occurred.		1848-52.	1853-4.	1848-9 and 1853-4.
Aberdeen Mews	16	3	2	–	–	3	–	–	–	–	–	–	–
Allen Court	6	1	1	–	1	2	–	1	1	–	1	–	–
Archer Street	294	18	14	3	2	48	7	1	1	1	1	1	–
Argyle Place	113	11	5	–	–	6	–	–	–	–	–	–	–
Arundel Street and Panton Square.	118	20	9	1	–	10	1	–	–	–	–	–	–
Argyle Street	244	34	7	2	–	15	2	–	–	–	–	–	–
Bateman's Buildings	200	16	12	2	–	17	2	–	–	–	–	–	–
Bear Street	49	5	5	2	1	9	2	–	1	–	1	–	–
Bentinck Street	327	13	14	4	7	51	11	5	7	12	–	7	–
Berwick Street	1,524	102	77	17	29	244	52	25	25	48	2	28	1
Blenheim Mews	32	6	3	1	–	4	1	–	–	–	–	–	–
Blenheim Street	191	16	12	5	1	21	8	–	–	1	–	1	–
Brewer Street	246	26	14	2	1	29	2	–	4	4	–	1	–
Bridle Lane	68	35	7	1	3	12	1	–	4	3	1	2	–
Broad Street	855	49	45	9	29	190	31	29	31	60	–	29	–
Brown's Court	17	1	2	–	–	2	–	–	–	–	–	–	–
Burlington Gardens	11	2	2	–	–	3	–	–	–	–	–	–	–
Burlington Street	–	–	1	–	–	1	–	–	–	–	–	–	–
Burlington Mews	–	–	2	1	–	2	–	–	–	–	–	–	–
Cambridge Street	173	15	13	3	6	39	6	3	12	15	–	6	–

Carnaby Street - -	965	58	51	17	14	162	33	14	5	17	2	12	–	
Carlisle Street - - -	175	18	11	3	–	22	3	–	–	–	–	–	–	
Castle Street - - -	36	8	4	1	–	4	1	–	–	–	–	–	–	
Catherine-wheel Yard - -	31	15	4	2	–	10	2	–	–	–	–	–	–	
Chapel Place - - -	177	20	16	5	1	29	8	1	–	1	–	1	–	
Charles Street - - -	90	12	3	–	–	4	–	–	–	–	–	–	–	
Church Street - - -	538	35	28	11	2	74	5	2	–	1	1	1	–	
Clifford Street - - -	114	18	10	–	–	13	–	–	–	–	–	–	–	
Coach and Horses Yard -	30	35	3	1	–	3	1	–	–	–	–	–	–	
Cock Court - - -	58	3	3	–	–	6	–	–	–	–	–	–	–	
Cooper's Court, or Pugh's Place	42	6	5	1	–	9	1	–	–	–	–	–	–	
Cork Street - - -	202	23	7	–	–	12	–	–	–	–	–	–	–	
Coventry Street - -	130	20	6	3	–	12	3	–	–	–	–	–	–	
Cranbourne Passage - -	31	4	2	–	–	2	–	–	–	–	–	–	–	
Cranbourne Street - -	147	25	11	2	–	13	2	–	–	–	–	–	–	
Cross Court - - -	30	4	3	3	1	4	3	–	1	1	–	1	–	
Cross Street - - -	367	14	13	4	5	71	10	4	6	9	1	5	1	
Crown Court - - -	192	9	12	6	1	37	8	2	–	–	1	–	–	
Crown Street - - -	642	40	30	11	5	111	6	3	2	1	4	1	–	
Dean Street - - -	947	96	63	24	3	123	32	–	3	–	3	–	–	
Devonshire Place - -	13	1	2	–	–	5	–	–	–	–	–	–	–	
Down's Place - - -	40	9	2	–	–	2	–	–	–	–	–	–	–	
Duck Lane - - -	21	21	3	–	2	4	–	–	2	2	–	2	–	
Dufour's Place - -	170	10	10	2	3	27	4	2	3	4	1	3	1	
Earl's Court - - -	50	6	3	1	–	3	1	–	–	–	–	–	–	
Edward Street - - -	95	9	7	–	4	15	–	–	4	3	1	3	–	
Falconberg Court - -	139	9	9	–	6	31	16	6	–	–	6	–	–	
Foubert's Place - -	28	4	2	–	–	2	–	–	–	–	–	–	–	
Frith Street - - -	609	65	28	3	–	36	3	–	–	–	–	–	–	
George Court - - -	81	8	6	–	1	12	–	–	1	–	1	–	–	
George Place (Cross Street) -	58	4	5	2	1	10	5	1	–	1	–	1	–	
George Street - - -	–	–	3	–	1	3	–	–	1	1	–	1	–	
George Yard - - -	47	8	4	2	–	11	3	–	–	–	–	–	–	
Gerrard Street - -	513	50	30	9	2	54	10	–	2	1	1	1	–	
Glasshouse Street - -	26	4	2	–	–	4	–	–	–	–	–	–	–	
Golden Place - - -	10	2	2	–	–	2	–	–	–	–	–	–	–	
Golden Square H - -	370	46	13	2	1	58	9	8	–	8	–	1	–	
Grafton Street - - -	464	27	22	13	4	80	24	5	–	2	3	1	–	

Summary Table, showing the Houses, Population, and Deaths from all Causes, &c.—*continued.*

Name of Street, Court, &c.	Population of Street, 1851.	Total No. of Houses in Street.	Number of Houses in which Deaths have occurred during the seven years 1848–1854,			Number of Deaths during the seven years 1848–1854,				Total Cholera Deaths in the Epidemic of 1853–4.	Number of Houses in which *Deaths* from *Cholera* occurred in the periods 1848–52 and 1853–4.		
				From Zymotic Diseases.			From Zymotic Diseases.						
			From All Causes.	Exclusive of Cholera.	Cholera.	From All Causes.	Exclusive of Cholera.	From *Cholera* alone.			1848–52.	1853–4.	1848–9 and 1853–4.
								In Houses where other Zymotic Deaths have occurred.	In Houses where no other Zymotic Deaths have occurred.				
Great Burlington Street	–	–	1	–	–	1	–	–	–	–	–	–	–
Great Chapel Place	–	–	1	–	–	1	–	–	–	–	–	–	–
Great Chapel Street	337	24	17	4	3	48	6	1	3	2	2	1	–
Great Crown Court	348	27	17	7	2	39	9	–	2	2	–	2	–
Great Newport Street	114	12	4	–	1	8	–	–	2	–	1	–	–
Great Marlborough Street	445	55	32	6	5	52	7	–	9	8	1	4	–
Great Pulteney Street	531	42	30	6	14	81	10	3	18	19	2	13	1
Great Windmill Street	286	29	18	7	1	59	8	–	1	1	–	1	–
Greek Street	675	64	37	14	2	74	16	–	2	1	1	1	–
Green's Court and Pulteney Place.	224	11	12	3	6	42	12	3	5	5	1	4	–
Green Dragon Yard	17	2	3	1	–	4	1	–	–	–	–	–	–
Ham Yard (Duck Lane)	5	3	1	–	–	1	–	–	–	–	–	–	–
Harris Place	82	4	2	–	–	5	–	–	–	–	–	–	–
Hayes Court	149	12	6	1	–	10	1	–	–	–	–	–	–
Heddon Court	235	12	14	6	3	37	9	1	2	3	–	3	–
Heddon Street	408	18	15	7	–	40	10	–	–	–	–	–	–
Hollen Street	352	16	15	4	2	61	9	1	1	1	1	1	–
Hop Garden	–	–	1	–	–	1	–	–	–	–	–	–	–
Hopkins Street	160	11	8	2	4	37	9	5	–	4	1	3	–
Horse and Dolphin Yard	19	2	2	1	1	3	1	–	1	–	1	–	–
Husband Street	237	10	9	2	2	37	5	2	3	5	–	2	–
John's Court	–	–	1	–	–	1	–	–	–	–	–	–	–
John Street	–	–	1	–	–	1	–	–	–	–	–	–	–

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Summary Table, showing the Houses, Population, and Deaths from all Causes, &c.—*continued.*

Name of Street, Court, &c.	Population of Street, 1851.	Total No. of Houses in Street.	Number of Houses in which Deaths have occurred during the seven years 1848–1854,			Number of Deaths during the seven years 1848–1854.				Total Cholera Deaths in the Epidemic of 1853–4.	Number of Houses in which *Deaths* from *Cholera* occurred in the periods 1848–52 and 1853–4.		
							From Zymotic Diseases.						
			From all Causes.	From Zymotic Diseases.		From all Causes.	Exclusive of Cholera.	From *Cholera* alone.			1848–52.	1853–4.	1848–9 and 1853–4.
				Exclusive of Cholera.	Cholera.			In Houses where other Zymotic Deaths have occurred.	In Houses where no other Zymotic Deaths have occurred.				
Nassau Street	72	10	7	–	1	9	–	–	1	1	–	1	–
Naylor's Yard	15	3	3	–	1	3	–	–	1	1	–	1	–
New Bond Street	73	7	3	1	–	3	1	–	–	–	–	–	–
New Burlington Mews	27	4	1	–	–	1	–	–	–	–	–	–	–
New Burlington Street	145	25	4	–	–	4	–	–	–	–	–	–	–
Newport Court	161	27	7	2	1	9	–	–	1	1	–	1	–
Newport Street	–	–	2	2	–	8	6	–	–	–	–	–	–
Newport Market	–	–	10	3	–	12	3	–	–	–	–	–	–
New Street	340	18	13	5	8	59	15	10	2	12	–	8	–
Noel Street	444	27	21	4	3	56	7	1	4	4	1	2	–
Old Burlington Mews	64	11	5	3	–	5	–	–	–	–	–	–	–
Old Burlington Street	274	33	11	1	–	18	1	–	–	–	–	–	–
Old Compton Street	742	49	33	9	–	83	11	–	–	–	–	–	–
Orange Court	22	2	1	1	–	5	2	–	–	–	–	–	–
Oxford Street (part of)	866	129	59	13	3	81	16	–	4	1	2	1	–
Peter Street	640	31	27	4	10	114	17	12	4	12	3	7	–
Philips Court	27	3	2	–	–	2	–	–	–	–	–	–	–
Plough Yard	21	1	3	1	–	4	1	–	–	–	–	–	–
Poland Street	789	63	49	7	12	107	10	4	8	22	–	12	–
Porter Street	503	28	23	9	4	88	17	3	11	1	3	1	–
Portland Mews	58	15	1	1	1	11	1	4	–	4	–	1	–
Portland Street	528	34	26	6	5	80	12	1	6	7	–	5	–
Prince's Court	33	4	3	–	–	9	–	–	–	–	–	–	–

Prince's Row	488	26	18	10	4	69	15	3	3	3	3	2	1
Prince's Street	530	67	29	10	–	67	–	–	–	–	–	–	–
Pulteney Court	153	8	7	5	5	36	3	3	4	6	1	5	1
Pulteney Street	–	–	8	–	1	8	–	–	1	1	–	1	–
Queen's Head Court	94	7	5	–	2	20	4	1	2	1	1	1	–
Queen's Street	428	35	18	7	1	42	7	–	1	1	1	–	–
Regent Street (part of)	1,092	127	43	11	2	53	12	–	2	–	2	–	–
Rose Court	–	–	4	–	–	4	–	–	–	–	–	–	–
Richmond Buildings	170	13	9	4	1	23	5	–	1	–	1	–	–
Richmond Street	231	10	12	3	1	28	5	–	1	–	1	–	–
Rose Street	265	15	12	6	2	43	2	2	–	1	1	1	–
Rupert Street	802	65	43	20	5	99	–	1	4	2	3	2	–
Ryder's Court	173	17	8	4	–	18	8	–	–	–	–	–	–
St. Ann's Court	543	27	27	6	17	123	25	17	9	22	4	14	1
St. Ann's Place	13	2	4	2	1	13	3	2	–	2	–	1	–
Saville Passage (Saville Row)	–	–	1	–	–	1	–	–	–	–	–	–	–
Saville Row	221	29	9	4	–	13	4	–	–	–	–	–	–
Ship Yard	36	2	2	2	–	4	2	–	–	–	–	–	–
Silver Street	587	48	32	10	11	88	19	5	9	13	1	10	–
Sutton Place	28	6	3	2	–	9	2	–	–	–	–	–	–
Shooting Gallery (Leicester Square).	–	–	1	–	–	1	–	–	–	–	–	–	–
Smith's Court	–	–	1	–	–	1	–	–	–	–	–	–	–
Soho Square	255	36	17	4	–	29	5	–	–	–	–	–	–
South Row	178	7	7	–	6	52	9	11	2	11	2	5	–
Spur Street	25	7	1	–	–	1	–	–	–	–	–	–	–
Star Court	45	4	4	2	–	5	2	–	–	–	–	–	–
Star Street	–	–	1	1	–	1	1	–	–	–	–	–	–
Sutton Street	120	8	8	3	–	19	3	–	–	–	–	–	–
Sydney Alley	23	2	2	2	–	2	2	–	–	–	–	–	–
Swallow Passage	7	1	1	–	–	1	–	–	–	–	–	–	–
Tichfield Street	52	5	3	–	–	6	–	–	–	–	–	–	–
Tyler's Court	116	9	5	23	1	18	4	1	–	–	–	1	–
Tyler's Street	136	16	9	3	2	25	6	2	1	3	–	2	–
Upper John Street	106	10	8	2	1	14	2	–	1	1	–	1	–
Upper James Street	105	7	7	3	3	17	3	1	2	3	–	2	–
Upper Rupert Street	193	10	10	7	–	28	8	–	–	–	–	–	–

Summary Table, showing the Houses, Population, and Deaths from all Causes, &c.—*continued.*

Name of Street, Court, &c.	Population of Street, 1851.	Total No. of Houses in Street.	Number of Houses in which Deaths have occurred during the seven years 1848–1854,			Number of Deaths during the seven years 1848–1854,				Total Cholera Deaths in the Epidemic of 1853–4.	Number of Houses in which *Deaths* from *Cholera* occurred in the periods 1848–52 and 1853–4.		
							From Zymotic Diseases.						
			From all Causes.	From Zymotic Diseases.		From all Causes.	Exclusive of Cholera.	From *Cholera* alone.			1848–52.	1853–4.	1848–9 and 1853–4.
				Exclusive of Cholera.	Cholera.			In Houses where other Zymotic Deaths have occurred.	In Houses where no other Zymotic Deaths have occurred.				
Vigo Street	41	6	1	1	–	2	1	–	–	–	–	–	–
Walker's Court	76	12	3	1	–	4	1	–	–	–	–	–	–
Wardour Street	1,383	124	91	33	12	183	45	6	12	17	1	11	–
Warwick Street	301	49	17	5	–	22	3	–	–	–	–	–	–
West Street	496	26	18	6	5	68	16	4	7	10	1	4	1
White Hart Street	–	–	1	–	–	1	–	–	–	–	–	–	–
William and Mary Yard	110	15	7	4	2	13	4	–	2	2	–	2	–
Workhouse (Poland Street)	628	–	–	1	1	816	83	44	–	34*	–	–	1
Total	42,005	3,485	2,204	686	386	6,580	1,126	318	323	537	86†	310	10

* Ten Deaths occurred in the Workhouse in 1849 and 34 in 1853–4.

† In the 86 houses referred to in the last column but two, there occurred during the years mentioned, 104 deaths, of which 97 were in the epidemic of 1848–9; the others sporadically, 5 in 1850, 1 in 1851, and 1 in 1852. Of the deaths recorded in the last column but three, 11 occurred sporadically in the year 1853, the remainder in the great outbreak of 1854. The "H" affixed to "Golden Square" (p. 3), is intended to intimate that the mortality of a Hospital is included in it.

(Signed) H. Edwards.

No. IV.

Pathological Memorandum, circulated among Medical Officers of Public Institutions, and other Members of the Medical Profession.

THE Medical Council, at the President's desire, have had under consideration what unsettled points in the *pathology of cholera* are at once most important for practical purposes, and most capable of receiving further light from accurate clinical and post-mortem inquiries.

In replying to this reference, the Medical Council are especially desirous that they should not seem in any degree to restrict the field of research, or to discourage independent scrutiny and registration even of the most familiar facts. There is no part of the subject but may be better understood through additional study; and the Medical Council would not willingly dispense with any fruits of careful and conscientious investigation.

With this qualification, the Medical Council would suggest that the physicians of our metropolitan hospitals and the junior officers who work under their direction in the registration of hospital experience, as well as other members of the profession who have the medical charge of public institutions, might, with much utility, collect scientific material in relation to the following questions:—

1. *Through what channel* does the exterior cause or poison of cholera first enter or affect the human body? is it through the lungs? or through the stomach and intestines? or otherwise?

2. Has the disease *a period of incubation?* if so, how long? and on what is it contingent?

3. Is there conclusive evidence, affirmative or negative, as to *communication of the disease from person to person?* Has any disproportionate liability to the disease been suffered by those in attendance on the sick, or by those engaged about their dead bodies, or occupied in cleansing their linen? Have cases of the disease occurred where personal infection was impossible? Have solitary cases arisen in large establishments, or been brought thither, without any diarrhœa or cholera ensuing among other inmates? Where choleraic disease has spread in an establishment, shortly after the arrival either of a choleraic patient or of some person from a choleraic locality, has the establishment previously been free from diarrhœa or fever, and unexceptionable in its sanitary arrangements?

4. Does anything indicate *a communication of the disease by provisions* supplied from houses in which cholera exists?

5. Have persons engaged in *particular manufactures* or other employments appeared to enjoy any special exemption from the disease?

6. Has the disease been observed in apparent *dependence on particular articles of diet?* Has any immunity been enjoyed by persons deriving their water-supply from a different source to that generally supplying their district? Has it occurred to persons who have drunk no other water than such as had previously been distilled, boiled, or filtered through charcoal?

7. Does cholera *begin as a morbid process of the gastro-intestinal mucous membrane?* or is this preceded by some state of general poisoning which requires the gastro-intestinal membrane to act as an emunctory? Is the state of collapse determined by this gastro-intestinal flux, and in proportion to it? or can it arise independently of any such flux? How are the lividity and the cramps determined and proportioned?

8. What conditions determine the occurrence, duration, and severity of *consecutive fever?* What are the varieties of morbid condition included under this term? To what extent does it depend on the previous occurrence of profuse discharges, or on the completeness of collapse? Does stupor in this stage always depend on uræmia, or on what? In what proportion of cases, and under what pathological conditions, is the fever accompanied by exanthem?

9. When *diarrhœa and cholera* prevail together epidemically in a district, are they (with differences of degree) *the same disease?* does the diarrhœa, if left to itself, generally and safely tend to spontaneous recovery? or do such cases, without medical treatment, frequently, in proportion to their numbers, pass into true cholera? Is there any way to discriminate a premonitory diarrhœa.

10. What changes—physical and chemical—are undergone by *the blood in cholera?* Does the consecutive fever represent, in regard to the blood, a period in which this fluid is tending to recover from injuries inflicted on its constitution during the stage of gastro-intestinal flux? Or is it attended by any process of change in the blood, leading to critical discharges or inflammations?

11. Does any *obstruction of the capillary circulation* in the Malpighian tufts of the kidney, or in the lung or brain, or elsewhere, arise either from inspissation or other physical affection of the blood in cholera? Do any infiltrations or other parenchymatous changes, which have been observed in persons dead

from cholera, arise in consequence of such obstructions? Or do all these structural lesions arise as ordinary inflammatory processes?

12. Does the *non-discharge of bile* with the rice-water secretions of cholera depend on tumefaction of the ductus choledochus? or on what?

13. Is the *rise of temperature* which has occasionally been observed *after death by cholera* confined to cases where death occurs during collapse? Does it occur only at the surface of the body, and, if so, depend on a return of blood to the surface? Or does it occur also in the visceral cavities of the body, and in the substance of solid organs?

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty.
For Her Majesty's Stationery Office.

Whitehall, December 30, 1854.

SIR,

IN compliance with the request of the President of the General Board of Health conveyed in your letter addressed to me on the 26th October, I beg to transmit the accompanying report on the Epidemic Cholera, as it prevailed in the Metropolis in 1854, embodying an abstract of the reports sent in by the Medical Inspectors who had charge of the different Parishes and Unions.

I am, Sir,

Your obedient Servant,

JOHN SUTHERLAND.

T. Taylor, Esq.,
Secretary,
General Board of Health.

REPORT.

As the Medical Council has been charged by the President of the General Board of Health with the duty of preparing a report on the late Epidemic Cholera, having special reference to scientific inquiries and discussions, it will not be necessary for me to do more, in the present report, than state as briefly as possible (chiefly from the reports of the Medical Inspectors) the extent of the epidemic; the localities principally affected; the more obvious localizing causes of the disease; the measures adopted under the Nuisances Removal and Diseases Prevention Act, and the regulations of the General Board of Health issued under that Act, for mitigating its ravages; with the defects in existing powers and authorities which have been rendered evident by the result of the experience obtained in putting the provisions of the Act in force.

Section I.

The Epidemic, the Localities chiefly affected, and the Steps taken by the General Board of Health.

The epidemic of 1854 is the second outbreak of cholera which has occurred in the metropolis since the epidemic of 1849. In the autumn and winter of 1852, a number of suspicious cases occurred in various districts of the metropolis; and in consequence of this I was directed by the General Board of Health to make a special inspection of the epidemic localities on both sides of the river, and to report on their condition. These reports were printed and circulated for the information of the local authorities.

No deaths from cholera were registered during the month of January 1853. There were two deaths in February; two in March; six in April; one in May; three in June; and eighteen in July. During the subsequent four weeks of the month of August the mortality was 4, 10, 18, and 16. In the four weeks of September the deaths were 7, 16, 29, and 47. During October the epidemic progressed, the weekly mortality rising to 66, 45, 83, and 99. The outbreak reached its maximum on the first week of November, on which week the deaths from cholera were 102, and during the following weeks the mortality fell to 98, 72, 46. In December the deaths declined week by week to 28, 13, 11, and 10, on the week ending the 31st.

During the epidemic outbreak of 1853 the current weekly mortality from diarrhœa, a disease which prevails in the metropolis through

all seasons and temperatures, rose along with that from cholera. It declined with it also, and continued to occasion its usual mortality from the beginning of 1854, until the cholera appeared in an epidemic form in the month of July; the deaths throughout this period varying between 10, the lowest, and 38, the highest number of deaths per week.

During the earlier part of the year 1854, cholera had nearly disappeared, but there were occasional deaths registered. These amounted sometimes to one, sometimes to two a week, while none were registered for several consecutive weeks. The total deaths from cholera from the 1st of January till the 1st of July of the present year amounted only to 16. The cases appear, many of them, to have been aggravated forms of diarrhœa or English cholera, occasionally followed by consecutive fever, but generally continuing for a longer period before death than usually happens with Asiatic cholera.

Sometimes the cases were more rapid in their course. One of the earliest of these rapid cases occurred at Fulham, on the 20th May. In this instance death ensued in 15 hours after the time of attack. The usual interval between seizure and death was from 24 to 36 hours.

The following are the dates and residences of the 16 fatal cases which occurred during the first six months of the present year.

10th January	Periwinkle-street, Stepney	Choleraic diarrhœa.
12th „	High-street, Notting-hill	Cholera infantum.
18th „	Camden Town	Cholera.
28th „	Ship Emma, off Wapping	Cholera.
4th February	Charles Street, Hackney-road	Cholera.
3rd April	Prospect-place, Whitecross-street	Choleraic diarrhœa.
4th „	Hardin's-lane, Woolwich	Cholera.
13th „	Baynes'-row, Amwell	Cholera Anglica.
„ „	Workhouse, Islington	Cholera, consecutive fever.
15th „	Dales'-place, Spitalfields	English cholera.
19th „	Crow-lane, Fulham	Spasmodic cholera.
26th „	Workhouse, Mile-end New Town	Cholera.
27th „	Rich-street, Limehouse	Spasmodic cholera.
8th June	Crown-street, St. Margaret's, Westminster	Cholera.
16th „	Mill-lane, St. Paul's, Deptford	English cholera.
17th „	Cash's-ground, St. Saviour's	Cholera.

These facts prove that the late epidemic, like that of 1849, was ushered in by a number of sporadic cases, scattered over the metropolis before the great outbreak took place.

During the whole of the first six months of the present year, there were a few deaths weekly from dysentery, the highest number being seven.

The mortality from typhus fever varied from 40 to 64 a week during the same period. The highest number of deaths from this disease occurred in the beginning of October, when 88 persons

died in one week. The whole class of zymotic diseases proved fatal to between 200 and 300 persons a week till cholera became epidemic, and the maximum mortality from the zymotic class took place on the week of the maximum mortality from cholera. During that week ending September 9th, no fewer than 2,558 inhabitants of the metropolis died of a class of diseases the ravages of which might be very greatly mitigated, if not prevented, by the adoption of measures for protecting the public health.

Cholera became epidemic in the metropolis early in July. No death from the disease had occurred from the 17th June. But on the 5th July, a female infant, six months old, died of "choleraic diarrhœa," in Belvoir-terrace, St. John's, Westminster, after an illness of 24 hours duration.

This case was followed by a number of fatal cases occurring in various districts of the metropolis.

On the 7th July a child died in South Chelsea. On the 8th there was a fatal case in Rotherhithe, and another in St. George's-in-the-East, in which death ensued in 12 hours. On the 9th a seaman died on board ship off Bermondsey, after 16 hours illness. A fatal case occurred in Marylebone on the 12th, another at Brixton on the 14th, and another in Shoreditch parish on the 15th.

During the ensuing week there was a rapid and progressive increase of the epidemic.

On the 16th July there were four fatal cases in Greenwich, St. George's Southwark, Poplar, and Spitalfields.

On the 17th a death took place in Chelsea, and another in Holborn Union.

There were three deaths on the 18th in St. Pancras, Bromley, and Bermondsey.

There were six deaths on the 19th, one in each of the following places,—Chelsea, Hackney, Hoxton, Limehouse, Battersea, Bermondsey.

On the 20th there were five deaths in Poplar, Lewisham, Lambeth, Whitechapel, and St. Olaves.

On the 21st a death took place in Holborn Union, two at Limehouse, and one at Bromley.

There were seven deaths on the 22d,—one in Limehouse, another in Chelsea, a third in the Savoy, and the remainder in St. George's-in-the-East, Camberwell, Rotherhithe, and one on board the Dreadnought hospital ship.

The epidemic by this time had shown its presence over the whole of the metropolis, and during the week ending the 29th July there were 133 fatal cases of cholera, and 84 fatal cases of diarrhœa. There was a rapid increase of the epidemic in the course of the month of August, and it reached its acmé in the second week of September, almost on the same day on which the epidemic of 1849 occasioned the highest mortality. There was indeed a remarkable similarity throughout in the progress and decline of both epidemics. On the week ending the 9th September there were 2,050 deaths from cholera, and 276 deaths from diarrhœa. The epidemic attained its

maximum in nine weeks, but it declined more slowly than it advanced, for the mortality did not fall to that of the first week of the epidemic until 13 weeks after the maximum period. During the advance of the cholera, there was a corresponding increase of the mortality from diarrhœa. Both forms of the epidemic attained their maximum mortality at the same time, and both declined together.

Table I. in the appendix gives the weekly statistics from the beginning of 1854 till the decline of cholera. Assuming the 1st of July as the commencement of the epidemic and the 16th December as its termination, the following table will represent the total mortality from cholera, diarrhœa, typhus, and other zymotic diseases, as contrasted with the mortality from all causes.*

Deaths.				
Cholera.	Diarrhœa.	Typhus.	All Zymotic Diseases.	All Causes.
10,675	2,601	1,347	19,413	40,599

Although there were deaths from cholera over the whole of the metropolis, the mortality was very unequally distributed.

On the north side of the Thames among a population of 1,745,701 (at the last census) it was 4,948, or one death from cholera to 353 inhabitants, while on the south side of the river the deaths out of a population of 616,635 amounted to 5,729, or in the proportion of one death to every 108 inhabitants. The mortality on the south side was thus above threefold, in proportion to the population, what it was on the north side of the river.

The mortality in the districts north of the Thames was by no means equally distributed, but was generally speaking greatest on the lowest levels, with one marked exception, namely, the virulent outbreak of cholera in part of the parish of St. James, Westminster, which I shall make the subject of a separate report.

Table II. in the appendix gives the population and deaths from cholera during the epidemics of 1832, 1849, and 1854 for each parish and union of the metropolis. This table exhibits a considerable variation in the relative mortality of the two last epidemics in the same districts; and making every allowance for partial local improvements, it confirms the observation made during the epidemic of 1848–49, namely, that although localities presenting certain defective sanitary conditions are the special seats of cholera, such localities sometimes escape, or are not always attacked with equal severity.

The facts now stated will account for the greater attention which the General Board of Health directed to certain parts of the

* Besides the deaths from cholera given in the table, there were 3 deaths registered on the week ending December 23d, and 2 deaths on the week ending the 30th. The total mortality from cholera during the year 1854 was therefore 10,696.

metropolis than to others, and in doing so the Board was guided by the experience of former epidemics, which in the main has been confirmed by the experience of the one which has passed away.

I next proceed to state the steps taken by the General Board of Health.

In consequence of the severe outbreak of epidemic cholera in Newcastle-on-Tyne in the month of September 1853, an Order in Council was issued on the 15th of that month, putting in force for six months the Diseases Prevention Act, and authorizing the General Board of Health to issue rules and regulations for the mitigation of the epidemic.

These regulations were issued on the 20th September and 12th October 1853, and sent with an instructional letter to all the parochial authorities in the kingdom. The order in Council was again renewed on the 18th March 1854, and the regulations were re-issued on the 24th of the same month.*

By these regulations the local authorities were directed to carry out such sanitary measures of a temporary nature, as might remove the more obvious localizing causes of epidemic disease.

They were directed to prepare lists of epidemic localities in their parishes or unions; to cause these localities to be examined; to take steps for placing them in as healthy condition as possible by enforcing the removal of all accumulations injurious to health; to see to the cleansing of streets, courts, and alleys, the cleansing, lime washing or fumigating of filthy or infected houses; and they were also directed to provide places of refuge to which persons might be removed from infected houses or neighbourhoods.

The Guardians of the poor were further required to provide sufficient medical attendance for the sick, to open dispensaries for the gratuitous distribution of medicines, and to employ house-to-house visitors for the discovery and treatment of cases of cholera and diarrhœa, which might otherwise prove fatal through personal neglect.

At the end of last and the beginning of the present year Dr. Milroy was requested to re-inspect the worst portions of certain parishes in the metropolis, and to communicate personally with the local authorities as to the propriety of instituting precautionary measures.

The General Board of Health followed up these proceedings by drawing out and circulating among the local authorities a minute of instructions, (subsequently revised and confirmed by the Medical Council,) in which a most careful detail was given of every step required for protecting the public health and for saving life. The proceedings to be taken for improving the sanitary condition of epidemic localities were given step by step. The whole plan of organizing the medical relief of affected parishes was laid down with precision, and it was anticipated that very little interference on the

* A new set of regulations, containing in the main the same provisions, though in a briefer form, were issued by the President of the present Board on the 8th and 14th Sept. following.

part of the Board with the proceedings of local authorities would be necessary in future.

Such was the position of matters when the constitution of the General Board of Health was changed by the Act of last session.

The President of the newly-constituted Board came into office on the 12th of August, and finding that the epidemic by that time was progressing rapidly, he on the same day issued a circular letter to all the Boards of Guardians of the metropolis offering the assistance and advice of the Board through its Medical Superintending Inspectors to any Boards of Guardians who might require it.

To this circular a number of replies were sent in. Several Boards accepted the offer of advice; a number of others gave unsatisfactory accounts of their proceedings; several declined assistance on the ground that they were doing all that was necessary, and from some Boards no answers were returned.

Of the few Boards who accepted assistance the majority were not those of parishes which suffered much from the epidemic, and in one or two instances of severely affected parishes, the advice asked for and given was not acted on.

The epidemic during this period continued to advance rapidly, and seeing that there was no appearance of any efficient measures for protecting the public health of the metropolis being in operation, the President determined to appoint a number of Medical Inspectors to visit all the parishes most severely affected, and to inquire what really was being done. This was on the 31st August, and on the 2d September the inquiry was commenced.

A circular was sent to the vestry clerks of the parishes requesting that meetings of Guardians might be held at a time specified to receive the Inspectors, the notice being as short as possible. Lithographed instructions were put into the hands of each Inspector, by which he was directed to make inquiry as to the extent and efficiency of the preventive measures in each parish as laid down in the Regulations and Instructional Minute of the General Board of Health. He was to visit the infected localities and inquire into the local causes which might appear to have determined the outbreak of the epidemic. He was to see whether the cleansing and removal of nuisances required by the regulations had been done; whether there was sufficient medical attendance for the sick; he was to urge in the strongest manner the necessity of medical house-to-house visitation being carried out, and a sufficient amount of dispensary relief being provided. He was also to see whether proper houses of refuge and hospital accommodation existed, and whether all of the measures of relief in the affected districts had been duly organized. The Inspector was also instructed to report any deficiencies in the existing arrangements, and such additions and improvements as might be requisite. One special head of the inquiry was to ascertain the state of the water supply in the southern districts of the metropolis, on account of serious complaints having been made against it. The work was done so quickly, that in four days the whole of most infected districts of the metropolis were placed under

the supervision of Medical Inspectors. Each Inspector was directed to report as soon as possible, and day by day.

The reports were sent in to the President generally every day, who immediately minuted his instructions on the back of each report, and directed the Inspector to return to his district and to state the wishes of the President to the local authorities, urging them at the same time to adopt the steps required for saving the lives of the people.

The object of the entire procedure was to aid the local authorities without interfering with their freedom of action, and to lead them to fulfil the obligations imposed on them by the Statute without resorting to any attempts at compulsion by means of provisions under which the President was advised that the directions could not be enforced.

These minute proceedings were continued from day to day as long as the severity of the epidemic appeared to render it necessary, and in cases where the authorities would not do their duty, the President directed the Inspector to call for inquests on the bodies of any persons who had died from neglect. In a number of instances this course had to be threatened to secure compliance, but in only one case was it taken. This happened in Clerkenwell, where several lives had been sacrificed in consequence of neglect of the Board's regulations.

The following were the arrangements of parishes under the different Inspectors:—

Dr. Hassall - -	Lambeth.
	Wandsworth Union.
Dr. Headlam Greenhow -	St. Mary, Newington.
	St. George the Martyr.
	St. Saviour's, Southwark.
Mr. Walsh - -	Bermondsey.
	St. Olave's.
	St. John and St. Margaret Westminster.
Dr. Mortimer Glover -	Rotherhithe.
	Greenwich Union.
Dr. Macloughlin -	Stepney Union
	Poplar Union.
	St. Andrew, Holborn.
	St. Giles & St. George Bloomsbury.
Dr. Richard King	Shoreditch.
	Whitechapel.
	St. Luke's, Middlesex.
	Hackney.
Mr. George Glover	Bethnal Green.
	St. George-in-the-East.
	Islington.
	Clerkenwell.
Mr. Patterson - -	The Strand Union.
	St. James, Westminster.
	St. George, Hanover-square.
Dr. Fraser -	Chelsea.
	Paddington.

Some slight alteration in these districts was made to suit circumstances. Part of Dr. Fraser's district was transferred to Dr. Greenhow, in consequence of Dr. Fraser having been directed by the President to undertake a special house-to-house inquiry into the circumstances connected with the violent outbreak of cholera in part of the parishes of St. James Westminster, and St. Ann Soho. Dr. Hassall also visited Fulham, and inspected the parish of St. Martin's-in-the-Fields. In addition to these arrangements for the inspection of the parishes, Dr. Gilbert King, Inspector of fleets and hospitals, was directed to inquire and report on the state of the river and shipping, with the view of organizing suitable measures for the treatment of the premonitory stages of cholera on board ship.

It was not considered necessary at that time to institute any inquiry by inspection within the City of London, or in the large parishes of St. Pancras or Marylebone, because the epidemic had visited them with comparative lightness, and moreover the President had reason to be satisfied with the activity of the local authorities and with the proceedings taken by the local sanitary committees.*

At a later period Mr. Walsh was directed to visit these parishes, and reported favourably on their arrangements for meeting the epidemic in its then intensity. Reports of a similar nature were received respecting the parishes of Islington, Hackney, St. George Hanover Square, and Paddington; and hence the attention of the Inspectors was mainly directed to the parishes where the disease was most prevalent. I had myself previously met the Guardians of Kensington and Fulham, who agreed to carry out the necessary measures of precaution.

Besides the inquiries connected with the sanitary condition of affected districts, and the measures of protection in operation, the Inspectors were also directed to report any instances of improved sanitary arrangements they might meet with in their districts, and the effect of those improvements on the health of the inhabitants.

The Inspectors' reports on the whole epidemic in the metropolis being now before me, I shall next present as brief an abstract of them as possible, arranging the materials regarding all the parishes under a few heads.

Section II.

Sanitary Condition of Localities affected by Cholera and Diarrhœa.

All the inspectors agree in stating as the result of their experience that in those districts where cholera had become localized, they found it connected with obvious removable causes.

The chief place among these local causes is assigned to the state of the drainage, especially in the flat, low-lying districts south of the

* The voluntary exertions of the Local Board of Health of Regent-square church district, St. Pancras, headed by the Incumbent, are worthy of the highest commendation, as affording an example of how much good may be accomplished, even in the present defective state of the law, by vigilance and well-directed effort.

Thames, and in part of Chelsea and Fulham. In all of these parts of the metropolis, there are large masses of population dependent for their drainage on open ditches, tidal ditches, old badly constructed sewers, and still worse house drains, the result of the whole being that the excreta of a large part of the metropolis are not conveyed away, but are left to putrify and rot in the open air, in cesspools under houses, or in large underground sewers, always generating foul gases, which are poured out into the streets, or into the houses, while in the more open districts, the exhalations from the ditches keep the atmosphere in a constantly malarious condition.

Open Ditches.—The reports of the Inspectors contain numerous illustrations of the effect of these causes in predisposing the people to attacks of cholera; and it is worthy of remark, that the exhalations from open ditches, so much complained of at the present time, occupied a prominent position among the causes to which in former days the sweating sickness was attributed.

In describing those which traverse the Borough and Newington, Dr. Greenhow says,—

"The tide flows for several miles up some of these ditches bearing with it the excreta of the inhabitants of the lower district, but carrying with it, in its recession, only a small proportion of the noxious substances it meets in its course, the greater part remaining in the form of black organic mud, which is exposed by the ebbing of the tide for many hours daily to the influence of the atmosphere.

"It is by no means surprising that such a district should be one of the unhealthiest in London, that fever should there find a permanent resting-place, and that pestilence should select the locality as one of its most favorite haunts."

The following illustrations of their effects on the public health are given:—

Great Western-terrace, Kensall New Town, consists of ten or twelve cottages with gardens in front. There was no apparent cause of disease in this case, except that in front of the houses runs an open ditch passing into an open sewer. A good deal of diarrhœa, and several deaths from cholera, took place in these houses.

Dr. Fraser mentions an instance, in this same district, of five deaths having taken place in three houses. Behind one of those houses ran a foul ditch which receives the drainage of a number of privies. In a cottage nearest this ditch two persons died. The remaining three deaths were those of labourers living at a greater distance from the ditch, but who had worked in the field through which it passed. They had all complained greatly of the stench from it up to the time of their being taken ill.

Open ditches, used as sewers, are common in all the parishes that were under Dr. Greenhow's inspection.

He says, "wherever these ditches are used as sewers, more or less "cholera appeared in any houses sufficiently near to be affected by "the exhalations, and it was remarkable to observe the inhabitants "of the neighbouring streets visited by the epidemic in nearly exact "proportion to their proximity to the ditch."

One of these open tidal ditches runs behind Bath-terrace, Newington. All along the course of the ditch cholera has been prevalent.

Running parallel with this ditch is Devonshire-place, containing 16 houses and 114 inhabitants. Of this number 12 persons had cholera, and six died, while 68 of the remaining inhabitants had diarrhœa. All the cholera cases, and nearly all the diarrhœa, took place in the houses abutting on the ditch.

A similar stagnant ditch passes behind Clandon street. In five consecutive houses nearest the ditch, containing 30 persons, 10 had cholera and nine died.

These ditches are constant sources of typhus, in houses in their vicinity, and "a continual cause of parochial expenditure." Their injurious influence is stated to be "in direct proportion to their stag-"nancy, the smaller and more sluggish branches being infinitely more "noxious than the larger."

The parish of Fulham suffered severely from its open ditches.

Dr. Fraser, who examined into the causes of the fatal outbreak of cholera in Camberwell Workhouse, in addition to causes connected with the building itself, lays particular stress on the sanitary condition of the locality in which the workhouse is situated, and the vitiation of the air in the district by emanations from open ditches, piggeries, and other nuisances. He says there are not only local causes "enough to account for the outbreak of cholera, but to create "surprise that malignant epidemic disease should ever be absent from "the district." These foul ditches "traverse the neighbourhood in all directions, receiving the contents of the open privies." A street, called Harris-street, skirts one of them. This ditch receives privy soil and other refuse matter, and also the blood, dung, washings, and no small portion of the offal of a large slaughter-house. The blood from the slaughter-house coloured the ditch to a considerable distance, and the smell from it was most offensive. The people in Harris-street are generally obliged to keep their doors and windows shut in consequence of the stench. In that street, which consists of 20 houses, there were a large number of cholera cases, and in several of the houses there were two, three, or four deaths from the epidemic.

In this and some neighbouring streets, about 50 houses are dependent on a solitary pump for their water supply. This pump is sometimes dry, and the people are "days without water."

Structural Defects in Streets and Houses.—Dr. Greenhow, in describing the general sanitary condition of the houses in the districts under his inspection, states, that a great evil in these districts is, a total absence of any comprehensive plan of laying out ground for building purposes, and the neglect consequently of all arrangements for ensuring a free circulation of air round dwelling houses, and the existence of numerous narrow overcrowded courts and alleys, many of them mere *cul de sacs*. In one such court 12 per cent. of the inhabitants died of cholera in a few days, and most of the survivors had to be removed.

Another great evil is the existence of so many houses built back to back, with doors and windows only in front; with a dead wall behind, and no means of thorough ventilation. These houses are a constant cause of disease.

Dr. Hassall has made a similar complaint as to these back to back houses.

In all the poorer class of dwellings the means of ventilation are described as defective in the highest degree, and much disease and poverty result from the defect. The improvements already completed in dwellings for the labouring classes, show that the ventilation may be made sufficient even in the worst class of cottage property.

Cellar dwellings are stated to be still in use in many parts of the metropolis, contrary to the provisions of the Metropolis Buildings Act, 1844, as appears from the Parliamentary Paper No. 10, dated 14th December 1854. They ought to be abolished forthwith.

The smaller and poorer streets and courts are generally kept in bad repair. The gutters are stated to be badly constructed, and to retain foul water before the doors of the houses. The pavement of courts and alleys is in general very defective.

Mr. George Glover directs special attention to the condition of the dwellings in cholera localities. He describes the accommodation as wretched and confined; the houses overcrowded, ill ventilated, and badly lighted; the privy accommodation deficient; and the houses themselves intermingled with private slaughter-houses, cow-houses, stables, pigsties, and public privies.

Cleansing.—The wide open thoroughfares in the cholera localities are generally, though not always, well swept. The narrow back streets are very imperfectly cleansed, and the courts and alleys "entirely neglected at ordinary times."

Dr. Greenhow states that, in his districts, there appears to be no organized system for removing house refuse, and it hence accumulates in the back yards of the poorer class of property, so as to be injurious to health. The poor complain bitterly of neglect in this particular.

Mr. George Glover says that "the general paving and cleansing of the parish of *Bethnal Green* are very bad." They are both entrusted to one Inspector, who has various other duties to perform, and both are "sadly neglected."

Dr. Hassall states that the cleansing in some parts of Lambeth parish is so ill attended to, that for a period of nearly two months there was no dust contractor, and that in many cases the dust, along with refuse organic matter of all kinds, was not removed for several weeks during the prevalence of the cholera.

He states, also, his opinion that the legal process for abating nuisances is too tedious during the prevalence of a severe epidemic, and that some more summary method is required.

He states, that it has frequently happened that nuisances which the Inspectors have taken in hand at the commencement of the out-

break of cholera have not been removed until after the epidemic has ceased in the neighbourhood.

Sewerage.—The Inspectors agree in stating that the sewerage of all the localities is in a most imperfect condition. Many streets are unsewered. In others the sewers are imperfectly constructed, and become choked up with deposit which evolves the most noxious exhalations. Dr. Greenhow gives the following illustration of this fact.

"Dr. Jones, a member of the St. Saviour's Board of Guardians, informed me at one of the meetings that a bad smell from a sewer close to his surgery having caused much annoyance, he made application for its cleansing. That although the original capacity of the sewer had been considerable, a waterway of six inches only was open, and that 200 loads of soil and mud were removed from the sewer in the space of a very few yards."

It is also stated by Dr. Greenhow that a new sewer had recently been constructed in Guildford-street, St. Saviour's, but that the old one, which was nearly choked up, had been left pretty much in that condition. This old sewer runs under the foot-pavement on the north side of the street, and out of 22 deaths from cholera in that portion of the street, 14 took place in the houses on the north side, close to the old sewer.

Another great sanitary evil, incident to the districts south of the river, is stated to be the reflux of the tide through the sewers at high water.

In some parts the tide fills the sewer and rises in the gully grate up to the level of the street, having previously forced the sewer gases into the public streets, or through the drains into dwelling-houses.

Not unfrequently the basements of houses are flooded from the same cause.

The sewer water so pent up is forced through the sides or openings of the sewer into the sub-soil, and produces malaria over large districts, the effect of which, Dr. Greenhow says, is shown by the marks of miasmatic poisoning in the countenances of the inhabitants.

Dr. Greenhow adduces evidence of medical practitioners and members of Boards of Guardians, to show that house drains are often not trapped, and that disease is produced by sewer gas passing into the houses. Want of trapping is said to arise frequently from surreptitious connexions being made between the house drains and sewers by unskilful persons, and thus the advantages of drainage are converted into direct causes of disease.

The method of ventilating sewers by untrapped gulley grates and open grates in the middle of the street, is condemned as directly injurious to the public health, and many cases of cholera both during the late and previous epidemic are stated to have occurred near these apertures. So long as the present imperfect sewerage exists, some efficient system of ventilation is absolutely necessary.

Dr. Greenhow describes the present system of ventilation by street gratings as "most pernicious."

Dr. Hassall states, that the drainage in the districts under his inspection is very defective, many streets and roads being without any sewers; that the sewers in most cases do not empty themselves properly of their contents, but allow of their deposition and accumulation. Until these evils can be remedied, he conceives that some means of removing the unwholesome gases continually generated from the sewers are indispensably necessary.

Mr. George Glover states that in all the parishes under his inspection the sewerage is bad, and in fact in the greater portion of some of them there are no main sewers at all. The general deficiency and defective nature of the sewerage and house drainage of the narrow streets are notorious.

House Drainage.—Dr. Greenhow appears to have taken considerable pains to estimate the effect of the present condition of the sewerage and drainage of the metropolis in predisposing to cholera. He states, that it is difficult, where so many causes of insalubrity exist, to decide which is the most powerful in localizing the disease; that he directed his most earnest attention to the subject, and that whilst admitting that bad water, improper food, want, fatigue, depressing passions, bad health, and especially the existence of other diseases, powerfully predisposed individuals to attacks of cholera, the effluvia arising from collections of night-soil were by far the most influential. In certain cases, the atmospheric contamination arising from noxious trades appeared to have proved injurious, but, in by far the larger number of cases, direct vitiation of the air by open privies or by drains was obvious. The occurrence of disease from these latter causes, he states to be exceedingly common in the cottages both on the south side of the river and at Chelsea.

"The privies are most commonly untrapped, and placed over cesspools, or drains which seem to act as such." The privies are "most frequently situated in an extremely small back yard, often "built against the main wall of the house or wash-house, through "the foundations of which, after a time, the night-soil percolates, "until it penetrates into the sub-soil below the living apartment," or the privy is within three or four feet of the back door. Sometimes untrapped privies are actually situated inside houses. Where a privy has been common to a number of houses, it has repeatedly happened, that the occupants of the house situated nearest to it have alone suffered from the pestilence.

The effect of exhalations from badly constructed sewers was also observed to be highly injurious. Houses, in all other respects clean and wholesome, have suffered from the entrance of the sewer gases through untrapped drains and sinks. "In a great many cases, open "gully-holes in the streets have exercised a like baneful influence on "the internal air of houses."

"Sometimes ruinous drains pass close to the walls of houses, and the effluvia from them, penetrating through chinks into the basement, rise from thence by the interstices of the floor to the apartments above."

Mischievous Results of Drains passing under Houses.—The passage of drains underneath houses is stated by Dr. Greenhow to be a not less fruitful source of mischief. "Even when well constructed, this "is a great evil, as the slightest imperfection in the joining of the "pipe may lead to the most disastrous consequences." This is still worse when drains are roughly made of bricks, often only covered by flags or by the boarding of the floor. Houses drained in this defective manner entail "continual ill health among their inmates, with almost "the certainty of the cholera should it arrive in the district."

As an illustration of the effect of these causes of disease, Dr. Greenhow states the following facts:—

In Suffolk-street, in the Borough, there were deaths from cholera in 20 houses. In these houses, up to the 23d September, there had been 29 cases of cholera, and at least as many of diarrhœa requiring medical treatment, and 24 deaths. Not far from these houses, there are bone-boiling establishments, cat-gut manufactories, knackers' yards, the smells from which were much complained of, and besides the smells, no other cause of disease could be detected in three out of the 20 houses. In 11 houses there were untrapped sinks or privies, either within or in such close proximity to the houses as to pollute the air indoors. In one house there was a watercloset on the first floor communicating with a cesspool underneath the shop. In another, there was a cesspool for house-slops in the back area, covered with boards, and a contrivance to pump the liquid up into the yard, from whence it ran into the sewer. In another case, a brick drain ran beneath the house; the privy in the back yard was exceedingly offensive, and there were two untrapped sinks. In one house the privy was built against the kitchen wall, and the yard was undermined by rats so as to afford free egress to the effluvia from the drains. In another case, there was a most offensive untrapped gully immediately in front of the house. It is remarkable that the inhabitants themselves had, with few exceptions, overlooked these local causes of disease, and attributed the cholera solely to the unwholesome trades. Dr. Greenhow examined a number of houses in Suffolk-street, in which there had been no illness, and found their sanitary condition good.

The outbreak of cholera in Lant-street is referred by Dr. Greenhow to similar causes. There were deaths in 12 houses. In these houses there were about 100 inhabitants, of whom 19 had cholera, and above 20 others diarrhœa; 16 out of the 19 cholera cases proved fatal. In this instance, also, the drains passed beneath several of the houses. In one house, a foul and offensive privy was built against the kitchen. In another there is an untrapped sink close to the back door. In the other houses there were similar unhealthy conditions.

Another instance is given of four houses in Swan-street, in three of which the drains passed beneath the houses, occasioning nuisances and producing fevers among the inmates. These houses suffered from cholera and diarrhœa, but the fourth house, the drain from

which did not pass beneath the floor, escaped the epidemic altogether.

Both inhabitants and proprietors expressed a strong desire that this most injurious and dangerous manner of draining should be discontinued, and the sullage removed without passing under the houses.

These illustrations are taken, not from the worst streets or houses, but from the dwellings of respectable tradespeople in comfortable circumstances.

Privies and Cesspools.—Numerous examples of the dangerous results of effluvia from open privies in the small yards of cottages came under Dr. Greenhow's observation, from which the following instances are selected:—

In a house in Down's-buildings, Christ-church, two cases of cholera took place, one of which was fatal. There was an open privy, so situated that the effluvia permeated the house.

Two deaths occurred in a house in Queen Charlotte-court, St. Saviour's. This house had an open privy entering from the bed-room.

In a house in White Hind-alley, in the same neighbourhood, inhabited by three persons, the privy was situated under the same roof as the house. Two of the inmates suffered, one from diarrhœa and the other from cholera, which proved fatal.

Close to a house in Moss-alley, St. Saviour's, there is situated a foul and offensive privy, and a sewer passes close to the wall of the house. Three persons in this house died of cholera.

Great Bland-street, Newington, is a broad, airy, good-looking street, inhabited by respectable people. One of the houses is of a superior class, clean and unexceptionable, but it has an open privy over a cesspool, built against the kitchen wall. There is no drainage, and most of the cesspools in the neighbourhood were overflowing. The house in question was inhabited by five inmates, four of whom died of cholera.

A house in Lombard-street, St. George the Martyr, had its drains choked and offensive, with a foul privy opposite the back door. Two children, who occupied a room overlooking this privy, died of cholera.

There is a house in Swan Court, in St. Mary, Newington, against the gable wall of which there are several privies erected. Two persons in this house died of cholera, and two others had diarrhœa. In this instance, it is said that the soil from the privies had percolated through the wall, and infiltrated the earth below the flooring of the house.

A single death from cholera took place in White-street, in the Borough. This house had a watercloset within three feet of the back door, underneath which there is a large cesspool, receiving the drainage of several other houses, and the smell at times is overpowering.

In a small market garden, by the side of Kensall-road, Kensall-green, is a cottage, well isolated from every other dwelling. There is

no cause of disease near it, except an open privy, with a cesspool constantly full, immediately behind the house; and there is a rude brick drain passing underneath the cottage, and conveying the overflow from this cesspool to another in front, where it is collected for manure. Of four adults inhabiting this cottage, one had diarrhœa, and three were seized with cholera, of whom one died.

Manor gardens, Chelsea, is a large open unpaved court, which has been lately drained. Some of the houses are provided with water-closets, and others have the privy connected with the drain.

There was a good deal of diarrhœa in the court, and also one case of cholera, and that not a fatal one. Every inmate of the house where this case occurred, seven in all, had diarrhœa, and this house is the only one in the court which has a cesspool.

The absence of house drainage, Dr. Hassall found to give rise to a very great evil in the houses of the poorer classes in the districts under his inspection, namely, the use of cesspools and open privies. Both of these are often overflowing, and the stench from them pervades the whole house, and indeed he says, "the air of whole streets and courts is often polluted by the emanations."

They are also a frequent cause of the contamination of shallow well water, especially in suburban and rural districts.

Among the prominent local causes of disease in Bermondsey, Mr. Walsh mentions the house drainage and sewerage as being very defective, owing mainly to the low level of the district and the necessity for damming up the sewers and ditches, except during a low state of the tide. While this defect exists, complete structural arrangements for sewerage or for general house drainage are impossible, and partial changes that have been adopted, such as filling up cesspools without sufficient water being laid on to cleanse the drains, have sometimes been complained of as of doubtful efficacy.

Predisposing Effect of Sewer Gases.—The effluvia from deposits in badly constructed sewers, escaping through openings into public streets and houses, are amongst the most obvious predisposing causes of cholera. A few examples of this will suffice.

Dr. Greenhow states that in Crump's-yard, Chelsea, containing several houses, there is one immediately opposite an open gully; three persons out of four residing in this house were seized with cholera, and two died.

In First-street, Chelsea, are two houses, at a distance from each other, opposite each of which there is an offensive gully grate. Diarrhœa was prevalent in the street, but there was no cholera, except in these houses. In one of them there were eight or nine cases of diarrhœa, four cases of cholera, and two deaths; and in the other, there were two deaths from cholera, and several cases of diarrhœa.

Dr. Fraser gives the following illustration of the injurious effects of emanations from a large offensive untrapped gully opposite New-terrace, Camberwell green. "In the house, No. 6, immediately facing "this gulley, two deaths from cholera have taken place. In the adjoin-"ing house two patients are now ill with this disease, and one has "recently recovered from it in a house a few doors off."

Dr. Greenhow also mentions a case of a respectable woman being carried off by cholera, from accidently inhaling the effluvia arising from a gully near St. George's Church, in the Borough.

A fatal case of cholera, and several cases of diarrhœa took place in a house in Garden-row, Southwark, opposite the door of which is an untrapped gully grate, to which the inmates directly traced the disease.

Five persons residing in East-place, also in the Borough, were all attacked with diarrhœa; and one of them died of cholera. The assignable cause in this case also was an offensive gully grate opposite the door.

Dr. Greenhow states that similar facts came continually under his notice in every portion of his district.

Noxious Trades.—The influence of noxious trades and nuisances in predisposing to attacks of cholera has been observed during the late epidemic.

Dr. Greenhow says, that complaints of these trades were very early made to him in the Borough, "and there can be no doubt," he says, "that the insalubrity of the district is much increased by their being conducted in the midst of a thick population." Dr. Greenhow met with several cases of fever in streets near the premises where unwholesome trades are carried on, and "typhus, or some other fever is rarely absent."

The following example is given by Dr. Greenhow, from the Borough. It is that of a dustman's yard, not far from Essex-street, St. Saviour's, in which there are always many hundred cartloads of dust, road-scrapings, and also night-soil. Close to this depôt is Devonshire-square, containing 22 houses and about 130 inhabitants. The place is clean, and there are no local causes connected with the houses themselves sufficient to account for the attacks of cholera which took place.

The people complained greatly of the nuisance from the dust yard. A large proportion of the inhabitants had diarrhœa; there were about twelve cases of cholera, eight of which proved fatal. A family removed from the square and another family took the house. Three of the members of this new family immediately took cholera, and one died. A good many cases of cholera and several deaths took place in each of the other streets round the dust yard.

Another similar instance of the injurious effect of a contractor's yard in the Borough is also given.

The effluvia proceeding from filthy stables, cow yards, and pigsties are cited among the aggravating causes of the epidemic, and instances are given of whole families, exposed to their influence, having been attacked by cholera and diarrhœa, some cases terminating fatally.

Mr. George Glover says that in the parish of St. George-in the-East there are "noxious trades in full operation, and much complained of by the inhabitants and medical men." There are 2 bone-boilers, 2 oil-boilers, 3 soap makers, 4 or 5 sugar refiners re-burning animal charcoal, 1 naphtha distillery, 4 water-proofing works, 1 candle maker, and 1 place where putrid fish are boiled. One of the worst of these

nuisances was abated by the simple expedient of passing the fumes through a furnace.

Dr. Hassall states that the chief noxious trades in Lambeth district are five bone boilers and crushers, a glue manufactory, and a dust contractor's yard on Belvidere wharf, where there is at all times an enormous collection of organic matter, including sometimes night soil, from which most offensive smells proceed.

There are other noxious trades carried on in Wandsworth, and Dr. Hassall expresses his conviction of the absolute necessity of putting a stop to these most prolific causes of disease.

The examples of specific localizing causes of cholera given in the preceding pages appear to be enough to illustrate the usual influence of these causes on the public health, and I shall therefore give a general outline from the Inspectors' reports of the localizing causes in other parts of the metropolis.

Dr. Macloughlin points out the chief sanitary defects in the Unions under his inspection as follows:—

"The great want of *Stepney Union* is proper sewerage and a proper supply of wholesome water."

"Great complaints exist against the bad smells arising from "noxious trades, such as chemical works, bone boilers, India rubber "manufactories, and heaps of dung, dust, and putrid matter, animal "and vegetable," which cannot be completely abated in the present state of the law.

It is stated that one of the Union guardians himself occasions a serious nuisance by collecting dung and night-soil and keeping pigs. In this instance two orders for cleansing were made, one after the other. Both were obeyed, but in a few days the nuisance was as bad as before.

Dr. Macloughlin states that diarrhœa and cholera were most prevalent and fatal in crowded localities, where the defective sanitary conditions above named were most marked.

In *Poplar Union* great complaints were urged against noxious trades, defective sewerage, and unwholesome water. These, he says, "materially injure the health of the poorer inhabitants, and "make them so liable to fevers at other times, and now to attacks of "diarrhœa and cholera."

He mentions several instances where, from these causes and from accumulations of filth, the population has been decimated by zymotic disease. The filth was removed with only temporary benefit, for the real cause of the mischief, the sewerage and water supply, being left untouched, things reverted to their old position in a few days.

In *Holborn Union* overcrowded courts and houses were the special seats of the pestilence, and in the localities chiefly affected the great evil was again the defective state of the sewerage and water supply.

Many nuisances existed in various parts of the union, which the guardians abated so far as their legal powers would admit, but as there is no law to prevent the repetition of a nuisance the evil re-appeared a few days after it had been abated.

The local authorities of *St. Giles and St. George, Bloomsbury*, were found to be doing all they could to ameliorate the sanitary condition of the people, but having no control over the sewerage and water supply, or over unwholesome trades, they could do little that was permanently effectual.

They nevertheless appear to have exercised the powers they had with vigour. The courts of suspected districts were kept constantly lime-washed; nuisances were removed; above 400 cesspools were filled up, and improvements conducive to health were effected in upwards of 1,000 tenements.*

Dr. Mortimer Glover describes the localizing causes of the epidemic in the parishes under his inspection as follows:—

In *Rotherhithe* the worst seats of cholera were those districts of the parish traversed by open tidal sewers, up and down which a slight tide flows from the Thames. "Most of these emit a strong smell of "sulphuretted hydrogen, and along the banks of one of the worst, "which I shall call Workhouse-ditch, from its close proximity to the "workhouse, the most numerous and fatal cases of cholera have "occurred."

"The existence of monstrous nuisances was admitted, and the "connexion of these generally with cholera, but the power of "remedying them was totally denied." The local authorities assigning as a reason that nothing effectual could be done without drainage, which they could not carry out for themselves, although perfectly willing to do so, on account of their being within the jurisdiction of the Commissioners of Sewers, from whom they could get no relief.

There were two inspectors of nuisances, but very little real good was effected notwithstanding the inspection.

In *Deptford* matters are, if possible, still worse. The drainage is exceedingly defective, and was an evident localizing cause of cholera. Dr. Glover gives an illustration of two new streets, called Commercial-road and Wellington-street, "where cholera has been most fatal." The houses are two stories high; the ground is open around them, they seem to be houses of a superior character and inhabited by people in comparatively comfortable circumstances. But they have no drainage, and the filth of the houses is left to percolate the subsoil.

"In almost all the places where the disease was prevalent most frightful nuisances existed, such as overflowing cesspools, slaughter-houses, piggeries, &c., along with total want of drainage."

"It may be doubted whether there is a proper sewer in Deptford." Dr. Glover states that the worst features of Newcastle fall short of those of New-street. "On the 2d and 3d September there were at least 40 registered deaths in this immediate neighbourhood and many died who were not registered."

"All attempts," he says, "to remove permanently such a state of things as there exists must prove abortive in the present state of legislation on sanitary matters."

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* Report of the Sanitary Committee of St. Giles and St. George, Bloomsbury.

At *Greenwich* many of the principal seats of cholera were places abounding in nuisances. In York-street Dr. Glover found above 200 people living in 20 wretched houses. In No. 5 in this street two deaths from cholera had occurred, and another was impending. Several deaths had also taken place in the immediate vicinity of this house. It was afterwards discovered that under the boarding of a room there was a depth of 10 inches of night-soil which had soaked from the adjoining privies. Dr. Glover says, "This is only one example of the many nuisances" he had observed.

Woolwich has a very active Local Board of Health elected under the Public Health Act, which was found doing its duty most energetically. The deaths from cholera chiefly occurred in Irish lodging-houses. In one of these houses in Rope-yard-rails there were 104 Irish. The house consisted of nineteen or twenty rooms, which had been tenanted by 120 persons previous to Dr. Glover's visit. In this house there were four cholera patients in one bed. Dr. Glover states that the smell in the house was "dreadful." "I "was myself," he says, "instantly conscious as of having received a "dose of poison, was ill all day, and at night had a violent attack of "diarrhœa and vomiting."

Mr. Patterson, who inspected those parts of the parishes of St. James, Westminster, and St. Anne, Soho, which were so severely affected by the epidemic, describes the dwellings as overcrowded, unventilated, without any efficient house drainage; the cesspools and privies overflowing; the supply of water scanty; some of the houses so filthy and unhealthy as to be unfit for human habitation; some of the sewers of the district in a foul condition pouring sewer air through the gulley grates into the streets and houses. He says there are in the district "almost every nuisance and abomination," slaughter-houses, cow-houses, boiling-houses, and other noxious and deleterious trades.

Mr. George Glover reports that the "potteries" in Kensington parish have suffered most severely from cholera. This place still retains its character for filth and disease. Pig feeding and the boiling of offal are still carried on as usual, the existing state of the law not being sufficient to enforce removal of the pigs and other nuisances. In the year 1849 the potteries contained 1,000 persons, fifty of whom died in the first ten months of the year, and of these twenty-one deaths were from cholera and diarrhœa. The population during the present year is about 1,270, and the deaths from cholera and diarrhœa have been thirty-three.

In a report on the condition of the epidemic localities in Waterloo-road district of Lambeth parish made to Dr. Fraser by Mr. Dodd, one of the union medical officers, he gives among the obvious causes of disease the sale of unwholesome food, private slaughter-houses, defective sewerage, untrapped gully grates, overcrowding of houses, and overflowing cesspools.

In a district of the Parish of St. Mary, Newington, called Lock's-fields, a report on which was sent to the General Board of Health by Mr. Keever, one of the medical visitors, it is stated that "diarrhœa and cholera prevailed to an immense extent; and in nearly

" all cases the ravages have been greatest, if not altogether confined " to those tenements, where the water was impure, the drainage bad, " and the cesspools foul and offensive."

The drainage is described as being "everywhere most imperfect." Where the privies communicate with the drains there are no traps, and the smell is very bad at times. The street gratings, the writer says, have been in many instances complained of from want of trapping. It is also a frequent occurrence to see the water-butts placed over untrapped drains. The cesspools are often overflowing, and they were found, in some instances, saturating the ground beneath the floors of rooms.

" There seems to be no system of scavenging," and all sorts of filth and débris " seem to remain for an indefinite period in many of the " bye-streets."

Dr. Gilbert King, who inspected the shipping on the Thames, points out in his report the foul and unwholesome state of the Thames water, from its intermixture with the London sewage. This water is used on board ship, and acts as a predisposing cause of cholera. The river banks, at low water, are in a filthy state from the same cause, and often expose the contents of privies or cesspools which have flowed from the houses. The exhalations from these pestilential banks of mud under a hot sun are most injurious to the purity of the air. Dr. King also ascribes much of the disease on board coal vessels to the dreadfully filthy condition of the sleeping quarters of the sailors, who are thus exposed to almost every cause likely to produce disease.

Mr. Glaisher has shown that Thames water contains an almost incredible amount of filth derived from the sewers, and that about four millions of gallons of water, loaded with putrescent matter, are every day evaporated from its surface within the metropolis, to be diffused through and to contaminate the atmosphere.*

Section III.

The Water Supply of the Metropolis in relation to the Cholera.

That a certain connexion exists between the use of impure water and the spread of pestilential disease is a circumstance that has been observed from the earliest times, and during the epidemic of 1848–49 it was found that the use of such water led in some instances to severe and fatal outbreaks of cholera.

In the report of the General Board of Health on that epidemic a number of carefully observed cases of this kind are given. One of these, the details of which I obtained myself, took place at Salford, in a street containing 90 houses. The inhabitants of 30 of these houses used water from a well, into which a sewer had leaked, and among them there were 19 cases of diarrhœa, 26 cases of cholera, and 25 deaths; while in the remaining 60 houses, which derived their water supply from purer sources, there were 11 cases of diarrhœa, but neither cholera cases nor deaths.

* Report of the Registrar-General on the Cholera of 1849.

There is a difference of opinion concerning the part which impure water plays in the phenomena.

It is believed by some, that the water which induces cholera contains the specific poison of cholera in it, probably derived from the evacuations of cholera patients; while others believe there is no sufficient evidence of this being the case, and they consider that all the facts go to prove that water containing putrescent organic matter acts as a very powerful predisposing cause of the pestilence in a similar way as does putrescent organic matter introduced into the system by the atmosphere or by food, but not as a specific poison.

The matter in dispute is really of no great practical value, for if it be a fact that the use of impure water is dangerous to the public health, the manner of its action is of very secondary importance, at least for practical purposes.

The controversy however having given rise to distinct allegations, setting forth the destruction of human life occasioned by the quality of the water supplied by the companies, especially to the southern part of the metropolis, it became necessary to inquire, 1st, into the quality of the water, and 2d, into the relation, if any, between the use of the water and the mortality from cholera.

Quality of the Water Supply.—The facts about to be stated respecting the water supply of the metropolis, refer exclusively to its condition during the prevalence of the late epidemic at a period when (except in the case of the Lambeth Company) the provisions of "The Metropolis Water Act, 1852," had not come into operation. Under that Act, the sources from which the water is taken, the manner of conducting it to the metropolis, and the construction of the reservoirs will be improved, and a portion of the evils complained of will it is hoped be remedied.

Two distinct and separate inquiries have been carried on to determine the quality of the water; one microscopic and the other chemical. The microscopic inquiry was remitted to Dr. Hassall, who has had great experience in similar investigations, and the chemical inquiry was undertaken by Dr. R. D. Thomson, lecturer on chemistry to St. Thomas's Hospital, who has specially studied the influence of waters for domestic use on the public health.

Dr. Hassall was directed by the President to examine specimens of the water supplied by all the metropolitan companies, to be taken at the source of the supplies, from the tanks in which the water is stored, from the companies' mains, and from service pipes, cisterns, water-butts, tubs, &c., through which the supply is received for use in houses and neighbourhoods where cholera was prevalent.

The microscope is a most important means of conducting such inquiries, because it affords a kind of evidence as to the relative purity or otherwise of water which could not be so well estimated by chemical analysis alone. The result of the whole inquiry has been embodied in a series of extremely interesting reports and drawings, of which I proceed to give a brief abstract.

Dr. Hassall states, that the sources from which every metropolitan company, without exception at present, derives its supply are more or

less impure. All the waters taken at those sources exhibit, under the microscope, a greater or less amount of organized matter, living and dead. The presence of living organisms is a sure test of the presence of dead organic matter, and all the specimens examined contained living organisms, animal and vegetable. The purest water at its source is the Lambeth water, taken from the Thames at Thames Ditton. The most impure, on the south side of the river, is the Southwark and Vauxhall water, taken at Chelsea Reach. This last water contains the débris of food derived from the waterclosets and sewers of the metropolis. It also contains living organisms which naturally belong to brackish waters, and proves that a certain amount of tidal sea water is supplied to the inhabitants of the district.

The same living organisms and organic matters are found in the water from the tanks, mains, and service pipes of all the companies. In certain instances, the water is so loaded with organic matter that zoophytes and vegetable productions are developed rapidly, and to a great extent in the mains, and are discharged in masses into cisterns and butts along with the water, and in these receptacles the water is in its worst condition, often containing large worms, vibriones, fresh-water shrimps, fungi, and other cryptogamous plants, in addition to myriads of animalcules belonging to a number of different genera and species.

The real practical deduction from the whole of the microscopical analyses made is, that there is no water at present supplied to the metropolis that does not contain dead and living organic matter, animal and vegetable. But, as has been stated, the Thames Ditton water, supplied by the Lambeth Company, is by much the purest of the waters, while the Southwark and Vauxhall water is one of the worst, and the waters of the other companies might be arranged in a series between these two. The Southwark and Vauxhall water is so similar to the river water, that Dr. Hassall says, "between "it and the water of the Thames, as taken from the river at the "spot at which the Southwark and Vauxhall Company obtains its "supplies, there is frequently only that amount of difference which "would arise from mere subsidence."

The effect of storing water in butts and cisterns is to increase its impurity. These receptacles are described as sometimes situated so inconveniently as not to admit of being cleansed. Sometimes they are placed close to privies, so that the water imbibes the emanations proceeding from them. Often the water-butt has no lid, and the water is thus exposed to light and air, both of which promote the generation of organic life. Sometimes the lid is permanently fastened down, and the cistern cannot be cleansed. "Examples without end," he says, "of these conditions might be cited. In the houses and "cottages of the middling and poorer classes the water is, for the "most part, stored in butts, vats, and pans; these commonly have "no lids, and they are unprovided with waste-pipes," and "the "water is very apt to flow over at the top and saturate the soil "around the house." "In many cases, the size of these butts is so

"small, that they do not afford anything like a proper supply of "water, while, in a great many houses, the water is not laid on at "all," and "the daily supply is procured out of the house, and is "kept in any jugs, dishes, or pans the people may happen to possess, "which are usually placed in the single room which serves as kitchen, "sitting-room, and bed-room."

The use of cisterns and butts tends also to the accumulation of the various organic matters deposited from the water. "We have seen," says Dr. Hassell, "dozens of cisterns half filled with green confervæ, "and other vegetable and animal productions." Such is the amount of noxious impurities sent into the mains, that a practice prevails in the districts supplied by the Southwark and Vauxhall Company of tying over the service-pipes and tops of the cisterns pieces of muslin, flannel, and very frequently old stockings, to act as filters, and "the "quantity of dirt and organic matter obtained in this way in a short "time is often perfectly surprising."

The water itself, as delivered, is described as "nearly always more "or less opalescent, containing in large proportions organic matter, "living and dead, vegetable and animal." "The complaints made of "this water are almost universal." "The Lambeth water," Dr. Hassall says, "is comparatively a pure water, clear and bright, "the amount of sediment furnished by it not being considerable. "This water is filtered, but the Southwark and Vauxhall water is "not filtered before delivery. At all events the amount of deposit "was usually so great, and the nature of the organic impurities "such, that it is scarcely credible that this water is subjected to any "process of filtration previous to distribution."

Dr. Hassall also examined a number of specimens of shallow well and pump waters, taken from neighbourhoods where cholera had been severe, and states, as a general conclusion, "that nearly all were of a very impure description."

I have received from Dr. Thomson the following abstract of the results of the chemical analyses of the London waters, which corroborates those arrived at by the microscope:—

"The chemical investigation has extended to the examination of upwards of 70 samples of water supplied by the various metropolitan water companies, principally to houses in which deaths occurred from the epidemic. The result of these analyses has shown that the greatest amount of foreign matter existed in the water supplied by the Chelsea Company, its total amount of impurity being 60 degrees (reckoning each grain per gallon a degree), while its amount of organic impurity was 5·41 degrees. This result was obtained in September, during the prevalence of the cholera, but it was afterwards (in December) found to be characterized by 37 degrees of impurity. The actual amount of impurity may vary from day to day, according to the state of the tide when the companies' engines are in action.

"Next to the Chelsea water the most impure water was found to be that of the Southwark and Vauxhall Company. Its impurity varied from 34 degrees to 72·66 degrees on one occasion, but the mean of

13 experiments gave 45 degrees as the mean impurity, that of the organic impurity being 4 degrees.

"The most striking evidence of the mixture of this water with decomposing animal matter was obtained by the extraction of a much larger quantity of ammonia from it than has been hitherto suspected. Indeed, the amount of this alkali is so considerable (as much as ·773, or upwards of three quarters of a grain of carbonate of ammonia per gallon) that it can be distilled over, fixed by means of an acid, and crystallized with the greatest facility. But this strong test of animal impurity was found in all the waters, and in very appreciable amount in the Thames Ditton water ($\frac{6}{10000}$ per gallon of carbonate of ammonia).

"This fact is an important but unfortunate one, since Thames Ditton has been chosen as the source of supply of all the Thames water companies.

"The following table gives the relative degrees of the total impurity of the metropolitan waters supplied to cholera houses, and taken as soon as possible after the occurrence of death.

Lambeth	13·36 degrees.
Grand Junction	14·46
West Middlesex	19
Southwark and Vauxhall	45
Chelsea	60·17
New River	17·18
Do. do. Soho District	25·64*
East London	18·30
Kent	17·76
Hampstead	24·22

"The water employed for domestic purposes has been likewise examined from a number of localities in which cholera was prevalent, such as Sandgate, Brasted, Newton Abbott, Nottingham, and numerous shallow wells in the metropolis, which last have been found much more saturated with noxious matter than could have been anticipated, the impurity rising from 100 degrees in the east to 180 degrees in the west of the metropolis."

The Medical Inspectors, who were more specially occupied with the measures for mitigating the disease in their respective districts, have given the results of their observations as to the condition of the water supply, as they found it in affected houses and neighbourhoods.

Dr. Greenhow says, "the Lambeth water in the tanks was beautiful, the smallest object being clearly discerned at the bottom," while the Southwark and Vauxhall water "was most turbid, full of animalcules, "and of small substances of confervoid or other vegetable character, "which, gradually coalescing, float near the surface, presenting "whilst in the water much of the appearance of small sponges."

Deptford, Greenwich, Woolwich, and the part of the parish of Rotherhithe east of the Surrey canal, are supplied from the Kent

* During the severe outbreak of cholera in St. James Westminster, and St. Anne Soho.

Waterworks, the western district of Rotherhithe being supplied from the Southwark and Vauxhall Waterworks.

Dr. Glover describes the sources of both these waters as pretty much alike, one being taken from the Thames, the other from the Ravensbourne, both of which receive a large quantity of sewage. Both waters contain organic matter and infusoria, the only apparent difference between them being, that the Kent Waterworks Company filter their supply better before it is delivered. This process of filtration, nevertheless, leaves a considerable amount of organic matter in solution.

In Bermondsey, which is also supplied by the Southwark and Vauxhall Company, Mr. Walsh says, "The quality of the water supply continued to be much complained of." Many courts are supplied by one or more open pipes, which flow for a certain time every day (except Sunday), and the daily supply for each house must be caught during the flow, and stored for use. In unpaved or ill-paved courts, the effect of this mode of supply upon the soil is very bad.

"The clause of the Water Act, whereby tenants or landlords may be compelled to lay on water, has never been put in force. There would be obvious injustice, it is felt, in forcing upon them such bad water."

"The baths and wash-houses have been supplied with water of so bad a quality that they have become greatly disused."

In his report to Dr. Fraser on the Waterloo-road district of Lambeth, Mr. Dodd, Union medical officer, remarks, "This district "is also partly supplied by the Vauxhall Water Company, and the "water is of a poisonous character, very full of dirt and animal matter, "and many of the water-butts are kept in such a bad state, and placed "so near the privies, as to be unfit for drinking use."

Dr. Hassall says, in regard to the Southwark and Vauxhall water, that it is his deliberate opinion that the use of this water ought not to be permitted an hour longer than is absolutely indispensable.

He further states that in several localities in the parishes under his inspection, there is no water supply at all, the people either buying water from water carts, or taking it from the Thames, the Wandle, or even from ditches.

With reference to the defective and unwholesome system of distribution at present in use, he says, "I beg to express my conviction "that the water supply of the metropolis will never be in a condition "at all satisfactory, until the use of cisterns is abandoned and the "constant method of supply adopted. This conviction has been forced "upon me by an inspection of a great number of the cisterns, butts, "pans, and tubs, now in use as receptacles for water."

Dr. Greenhow states that the intermittent nature of the water supply is a subject of universal complaint. It is sometimes on for no more than half an hour, unless there be a fire. The quantity is stated to be insufficient. The water butts in a very bad condition, and often extremely foul. There are frequently no butts at all, and he people have to watch for the water coming on, and in these

cases a sufficient supply is never obtained. In a small portion of St. Saviour's parish, there are 1,000 families without any means of storeage. Sometimes water tanks are constructed in the ground, close to privies, cesspools and sewers, the contents of which permeate the walls of the tank and pollute the water. The water for Bolton's gardens, Chelsea, a place which suffered greatly from the epidemic, is stored in two hogsheads which supply twenty houses, and the hogsheads, being very leaky, were empty for the greater portion of the day. In Eatling's buildings there is a small tank to supply a number of families, but the stone slab covering it is cemented closely down and cannot be removed to cleanse the tank. In Chelsea there are still a great many places where the people are dependent for water on bad wells or on the river. The inhabitants of Sun-court have to beg water of their landlord, who is a publican. Another publican in the neighbourhood supplies the people with water for dietary purposes.

The parochial authorities have power to compel water supply, but it is inoperative in many cases, as the authorities themselves often own the property, and Dr. Greenhow says, that the law does not apply to a large class of houses which have been sub-divided to accommodate a number of families, on account of the aggregate weekly water rate for the house being necessarily above that specified in the Act.

The water rate is stated to be ill-defined, variable, and not levied in proportion to the rental.

Dr. George Glover calls attention to the defective nature of the water supply in his district. It is complained of as being deficient in quantity and bad in quality. It is received in tubs, pails, &c., which are generally placed close to the privies.

The grievous deficiency of water arising from the manner of distribution was experienced in many of the streets and houses most severely affected by cholera.

Mr. Walsh states that "the localities visited in Westminster, New-"court, Ship-court, and others near the workhouse, were nearly all "suffering from want of water. The supply is only for an hour or less "daily; none on Sunday, and frequently from *open pipes only* "running to waste until caught."

It has been stated to me, as a proof of the mischievous results of the present system of supplying the metropolis with water, that the two companies supplying—the one the best, the other the worst—water south of the Thames, often run their mains through the same streets, but by an arrangement between the companies, no one, however convinced he may be of the unwholesome character of the water supplied to him, can obtain the purer water.

Effect of the Water Supply on the Health of the People.—In the districts south of the Thames, where nearly every conceivable sanitary defect exists, there are great difficulties in estimating the precise statistical effect of the water used on the health of the population during the recent epidemic. So far as the inquiries instituted by the Registrar-

general go, they certainly exhibit some striking results, which are thus stated.

"In 26,107 houses that derived the water from Ditton, 313 deaths from cholera occurred in 10 weeks. In the 40,046 houses that received the impure water from Battersea, 2,443 persons it was ascertained died from cholera in the same time. The deaths in the latter districts exceeded by nearly 2,000 the deaths that would have occurred if cholera had only been as fatal as it was in the houses that derived their water from Ditton. The Registrars were probably in some cases misinformed, but there is reason to believe that no undue proportion of deaths is referred to houses that the Southwark Company supplies."

It would thus appear that the mortality in a given number of houses supplied by the Southwark and Vauxhall Company when compared with the mortality in the same number of houses supplied by the Lambeth Company would be about as 5 to 1.

When it is considered that the sanitary condition of the population does not materially differ, except in the quality of the water supplied by the two companies, it is difficult to resist this statistical evidence of the predisposing effect of the Battersea water, and of the loss of life which has arisen from its use.

In Dr. Thomson's report already quoted he says:—

"If water be not an accessory in the production and propagation of cholera, it is a remarkable collateral fact that where cholera has been most fatal in the metropolis the water supply has been most impure. In the Soho district a very remarkable circumstance occurred in the houses supplied by the New River Company. In these it was found that the water, although taken on the same day, possessed a totally different composition from that contained in the reservoir at the New River Head; for while the impurity of the reservoir water was 17.18 degrees, that of the Soho district, obtained from the New River Company, as ascertained by the water receipts, but from what source is unknown, was 30 degrees; the organic impurity being 1·51 degrees in the first case and 2 degrees in the second instance."

Dr. Greenhow states, that the districts which were under his inspection are supplied with water from five sources, namely, Lambeth, Chelsea, Southwark and Vauxhall Waterworks, the Thames, and springs.

The Board of Guardians of St. Saviour's entertain the opinion, he says, that the nature of the water supply had a material influence on the development of the epidemic in their union.

The facts which apparently justify this inference are the following:

In the year 1849, both the parishes of this union, St. Saviour's and Christchurch, derived their water supply from the same source, namely the Thames, through the Lambeth and Southwark and Vauxhall Companies.

In that year the mortality from cholera was 100 in 10,000 of the population of Christchurch, and 73 in 10,000 of the population of St. Saviour's.

After the epidemic of 1849, Christchurch parish was exclusively supplied with the new and comparatively pure water of the Lambeth company, while St. Saviour's continues to be mainly supplied with the impure water of the Southwark and Vauxhall Company. During the late epidemic the mortality in St. Saviour's had advanced from 73 to 97 in 10,000, while the mortality of Christchurch had fallen from 100 in 10,000 to 44 in 10,000 of the population. This great difference is sufficiently striking; but, while admitting the beneficial results of the purer water, Dr. Greenhow considers it not to be entirely due to the water alone, for Christchurch parish has been improved in other respects of late years, by the covering over of a pestiferous ditch which formerly occasioned a great deal of atmospheric impurity in the neighbourhood, and by other sanitary measures.

In proof that impure water, though a predisposing cause of cholera, does not act as a *specific poison* in producing cholera, Dr. Greenhow adduces several instances in which houses supplied by the Lambeth water suffered from cholera, while those supplied by the Southwark and Vauxhall water escaped. In these cases the greater predisposition to the disease is considered to have arisen from the foul and offensive state of the drainage in the houses supplied by the Lambeth water, and the diminished liability of the houses supplied by the Southwark and Vauxhall water is traced to the counteracting influence of the better condition of the drainage, and to the otherwise better sanitary condition of the houses. He states, nevertheless, as the result of his experience, that the use of the Southwark and Vauxhall water "very greatly aggravated the pestilence."

Several facts were stated to Dr. Mortimer Glover, in the districts under his inspection, to show the connexion between the use of the Southwark and Vauxhall water, and the prevalence of cholera.

Thus, in the part of the parish of Rotherhithe supplied from the Kent Waterworks, 15 cases of cholera had occurred up to a certain date, while 185 cases of cholera had occurred in other parts of the parish; and Dr. Glover says, that the medical men of Rotherhithe were of opinion, "that the impurity of the water had been influential in augmenting the severity of the disease." On the other hand, Dr. Glover states with justice, that the waters are very similar in character, and instances are adduced by him in which violent outbreaks of cholera took place in houses supplied from the Kent Waterworks; so that, from a comparison of the mortality of the districts supplied from the two sources, no satisfactory proof can be obtained, that one is more wholesome than the other. Dr. Glover, however, does not deny in the abstract that the condition of the water may be a predisposing cause of cholera, and cites one remarkable instance in favour of that view in his report.

Mr. Keever, one of the medical visitors in the parish of St. Mary, Newington, in his report on his district, already quoted, says in regard to the waters of the Southwark and Vauxhall and Lambeth Companies, that the complaints among the poor as to the water sup-

plied by the former of these companies were general, both as to its quality and quantity; and he adds, "I feel bound to state my belief "that, *cæteris paribus*, diarrhœa and cholera have not prevailed to "the same extent where the water was supplied by the Lambeth "Company." In regard to the deficient supply of water for cleansing purposes, Mr. Keever says, "a thunderstorm is a great boon to the district."

Where water for domestic use has become actually poisoned by sewage, the effect in predisposing to cholera is much more powerful. An instance of this kind, which occurred at Chelsea, is mentioned by Dr. Greenhow. A drain from Sun-court, crossing Lombard-street, passes through the cellar of the house No. 18, on the opposite side of the way, and so into the river. There is a valve placed at the mouth of the sewer, to prevent the tide from entering it, which valve is under the control of the occupier of the house. On one occasion, during the prevalence of the epidemic, he neglected to give egress to the confined sullage, by opening the valve at the recession of the tide, and the sewer water escaped into a well in the cellar of the next house. Several of the persons in the house used this vitiated water, all of them had diarrhœa, and two had cholera, both of whom died.

In summing up his inquiry as to the effect of impure water on cholera, Dr. Greenhow says, "although doubtless the unwholesome "water has much aggravated the result, it is only one cause among "several;" and he adds, "the amount of mortality has generally borne "a direct ratio to the amount of atmospheric contamination."

On the whole, then, the evidence, from the experience of the epidemics of 1849 and 1854, as to the effect of impure water during an epidemic of cholera, may be summed up as follows:—

1st. That there is no sufficient proof that water in this condition acts specifically in generating cholera, or, in other words, that it is the specific cause of cholera.

2d. That the use of water containing organic matter in a state of decomposition is one predisposing cause of cholera.

3d. That the use of such water has aggravated the severity of the late epidemic, especially in the districts south of the Thames.

Section IV.

Measures adopted by the Boards of Guardians.

I next proceed to show from the Inspectors' reports what measures for protecting the public health they found in operation when they entered on their duties at the height of the epidemic, and to what extent the provisions of the Nuisances Removal and Diseases Prevention Act, and the Regulations and Instructional Minute of the General Board of Health, had been complied with.

Sanitary Precautions.—In Wandsworth and Clapham Union, Dr. Hassall states that there were six inspectors of nuisances appointed for this Union, but they were most inadequately paid. In

consequence of this, with the exception of Mr. Frost, they did but little, and often resigned their appointments when their services were most required. Very little chloride of lime was used for disinfecting purposes.

Dr. Hassall recommended additional scavenging and disinfecting; that a notice should be issued recommending the inhabitants to clean out all water butts and cisterns, and that the directors of the Southwark and Vauxhall Water Company should be recommended to clean their mains more frequently.

Although these precautionary measures were better carried out in this Union than in Lambeth, Dr. Hassall still considers that much more would have been done had the General Board of Health possessed powers for enforcing its recommendations. He says, "the "Guardians, as a body, are not fully alive to the value of cleansing and "disinfectant measures; they are not sufficiently impressed with the "fact, that it is cheaper to prevent disease than to treat it; and they "consider, that if some five or six cases of nuisances are brought "before the Board each week, all that is requisite is done."

He points out, that the inspectors of nuisances, as at present appointed, are by no means sufficient for protecting a population from epidemic disease. They are appointed simply for an emergency, and dismissed when it is over; while the necessity of continued inspection and cleansing of epidemic localities is not at all recognized.

Dr. Hassall states that in *Lambeth*, at the beginning of his inspection, two inspector of nuisances had been appointed, but the address of one of them given on the placards issued by the Board of Guardians, was at a loan office, with which he was connected, but where he did not reside. No one at the house knew his address. Inquiries were frequently being made for him, but, in almost all cases, applicants were obliged to go away without obtaining a hearing of their cases.

Dr. Hassall afterwards learned that the inspector resided out of his district altogether. On this being pointed out to the Board of Guardians, the inspector was required to reside in his district.

The other inspector resided in his district, but there was no name on the door to indicate his residence.

The inspectors were troubling themselves very little with precautionary measures, being satisfied with performing their average amount of work.

Dr. Hassall states, that in no instance, for a considerable period after the outbreak of the cholera, had the inspectors served any notices on landlords requiring lime-washing, neither had they themselves caused any lime-washing to be done in any part of the crowded and populous districts under their charge.

The inspectors had only one man each to assist them during the whole period of the epidemic, and these men were employed principally as scavengers. One of the inspectors had not used a particle of chloride of lime, and the other had used only 2lbs. for disinfecting purposes, for the greater period during which the cholera prevailed, and that among a population of about 140,000.

Dr. Hassall states that it was only after urgent remonstrances, and after threatening to place himself in communication with the coroner in any cases of death occurring in localities where the proper cleansing measures had not been carried out, that he succeeded in obtaining the adoption of these measures even to a limited extent, but before this was done the worst of the cholera was over, and even now not one tenth part of the cleansing required has been carried out.

In reference to the parishes of St. John and St. Margaret, *Westminster*, Mr. Walsh says, "The Nuisances Committee met once a "fortnight. That the inspectors of nuisances made frequent visits I "can myself affirm, and that lime-washing had frequently been applied "under their directions, but many instances came under my notice of "drains, cesspools, privies, unpaved courts, &c. being still in a most "filthy and dangerous state."

Dr. Greenhow states, that in Chelsea "nothing really had been done by the authorities to prepare for the epidemic," and the condition of the inferior class of property, he says, has gradually been retrograding in a sanitary point of view. As an illustration of the neglect of the Chelsea Guardians, he mentions an instance in which several deaths from cholera occurred from want of the necessary cleansing measures on the part of the Board. In this instance the houses were at last lime-washed throughout, and the cesspools emptied. Twenty-one loads of night-soil were removed, and the whole cleansing expenses for twelve houses amounted to 16*l.*

The neglect in this case arose from the Board not having exercised the powers of the Act so as to have put the houses in good sanitary condition, instead of delaying till several lives had been sacrificed.

Dr. Greenhow states that, in neither Chelsea, St. Saviour's, Southwark, St. George's, Southwark, nor in Newington, were the recommendations of the General Board of Health adopted and carried out with sufficient zeal. "When I commenced duty on the 9th "September," (after the epidemic had attained its maximum,) "I found "no cleansing staff belonging to the Boards of Guardians in any of the "unions or parishes under my inspection."

In St. George's parish, there was an active inspector of nuisances and several sub-committees of the Board of Guardians for inspecting courts and houses, but neither in St. Saviour's nor St. George's was any attention paid to the sanitary condition of the interior of the dwellings.

The inspector of nuisances of St. Mary, Newington, was inadequate to overlook so large a district.

In Chelsea, the relieving officers acted as inspectors of nuisances, but most inefficiently, on account of their time being almost wholly absorbed by their ordinary duties.

At *Rotherhithe*, Dr. Mortimer Glover found two inspectors of nuisances, and great efforts made to get rid of nuisances, but without success; the authorities alleging their want of jurisdiction over the sewerage as a reason, and the Guardians declined to proceed with the removal of nuisances, as entailing a useless expense.

There was no inspector of nuisances at *Deptford,* when cholera was at the worst.

In *Greenwich* there was at the same time no inspector of nuisances, and no attempts being made to abate nuisanees.

Taking all the parishes together, in which the epidemic was most fatal, it appears that in not one of them was the preventive machinery, sanitary and medical, organized in accordance with the Minute of Instruction, although some parishes had done more than others.

Houses of Refuge.—The opening of places of refuge, in which to receive families from overcrowded and infected houses and neighbourhoods until their houses were cleansed and lime-washed, was attended by the most salutary results during the epidemic of 1849.

The General Board of Health at that time issued special orders to the parochial authorities for providing such houses, and the results of the experience obtained, were sufficiently remarkable to prove that the removal of the people from places where cholera has become localized, is one of the most effective means of preserving human life.

It has been shown, that when cholera attacks the inmates of any house or group of houses, between 30 and 40 per cent. of the attacks take place in houses where more than one person has already suffered, and that in some instances 87 per cent. of the cholera attacks, and 61 per cent. of the deaths have taken place in houses where other attacks had already occurred. On removing these same people to places of refuge out of the affected district, it is found that a large proportion of them are seized with diarrhœa, which is easily discovered and cured by the medical officer in charge of the refuge, and that very few of the cases go into developed cholera.

The experience of six houses of refuge during the cholera in 1849, given in the report of the General Board of Health, showed that out of 1,691 persons removed from infected houses and localities, there were only thirty-three cases of cholera and ten deaths, a mortality of less than 0.6 per cent. of the population, or less than one twentieth part of the mortality in many affected courts and alleys.

In their Regulations and Instructional Minute, issued before the appearance of the late epidemic, the General Board of Health called the attention of the Boards of Gardians specially to this means of saving life; but I do not know of a single instance of any metropolitan parish having had a place of refuge, except the workhouse, in readiness before the epidemic broke out. In only one or two instances was a place of refuge provided after the disease appeared, and in only one parish, so far as I have been able to ascertain, was the accommodation so provided made use of.

The general practice in regard to this important preventive measure is thus stated by Dr. Greenhow:—

Another duty entirely neglected by all the Boards, without exception, was the provision of suitable houses of refuge, to which the healthy might be removed from infected houses, and much loss of life was no doubt entailed by this neglect. In a few cases people were removed to workhouses, but the working classes very naturally

refused to avail themselves of such a provision for their safety. Dr. Greenhow says, "one woman told me that rather than become a pauper, she would drown both herself and her children."

Dr. Mortimer Glover says that he strongly recommended the opening of houses of refuge at Rotherhithe, Deptford, and Woolwich, but without effect. At Deptford, Captain Martin offered the use of a ship for a hospital, but the offer was either not accepted at all, or the acceptance was delayed till it was too late.

In the parishes of *St. John* and *St. Margaret, Westminster*, Mr. Walsh says, "the notoriously filthy and overcrowded state of many whole streets and courts, pointed out the providing houses of refuge as a measure of the most obvious and urgent necessity.

"The Improvement Commissioners had and still have several of their condemned houses unoccupied. An inquiry made by me at the office produced a most complete and unqualified offer to place any of these houses which might be deemed suitable at the disposal of the Board, but no use whatever was made of these unusual facilities."

The only instance which has come to my knowledge of the removal of people from infected houses and localities, took place at Fulham, where the Guardians erected a large tent outside the workhouse for receiving children. In this tent they lived and slept.

Dr. Hassall gives the following as the result of the proceeding.

"I find," he says, "that 76 children in all had been received into "the tent; of these nine became subsequently attacked with "diarrhœa, and two of these cases passed into cholera, but both ended "in recovery. The first case of diarrhœa occurred three days subse-"quent to the removal from an infected house."

This experience confirms that of the epidemic of 1849, and along with it proves how large a sacrifice of life has been entailed on the community by neglect of this important precautionary measure.

Medical Relief Measures.—Before proceeding to describe the measures adopted for the medical relief of cholera, I shall abstract a brief description of the state of the health of the population from the Inspectors' reports, in order to show the nature and extent of the relief that was necessary to meet the emergency.

In describing the circumstances attending the appearance of the epidemic, and the universal prevalence of diarrhœa, Dr. Greenhow says that the choleraic aspect was generally well marked, and could be detected in persons residing in districts where cholera was prevalent, although perhaps these persons were free from disease, or were at most suffering from very slight diarrhœa; that cholera manifested the usual tendency to partial local outbreaks, attacking a single court or even a single house, cutting off several persons and then disappearing; that in all the districts there were nevertheless certain favourite localities from which it was hardly ever absent while the epidemic lasted. "Thus the first cases of cholera in Chelsea, in 1832, "were in Augusta-court, Lawrence-street, wherein there have recently "been several fatal cases." The earliest as well as the latest cases of the epidemic in Chelsea in 1848, were in White Hart-court, Lombard-street. The name of the court was changed in consequence,

but true to its laws, cholera appeared in the court early in the present epidemic, a death took place in the same house in which there was a fatal case in 1848. Other cases, and at least one other death occurred, and diarrhœa prevailed so extensively that one-half of the inhabitants were under treatment for it. Other similar instances are also mentioned.

It was observed in the parishes of *St. Giles and St. George, Bloomsbury,* that in nearly five cases out of six, the late epidemic occupied the same localities as its predecessor of 1849. Even particular houses showed a local affinity for the disease. Thus in eighteen such houses, there are recorded nearly one-third of the whole number of cases, and of these same eighteen houses every one was also visited by the cholera in 1849.*

The tendency to partial outbreaks was observed with regard to diarrhœa as well as cholera, and although Dr. Greenhow was occasionally informed of cases in which the more malignant symptoms came on at once without the previous existence of diarrhœa, he himself met with no such case, but he "invariably found on careful "inquiry, that diarrhœa of longer or shorter duration had preceded "the more urgent symptoms." Most frequently diarrhœa had existed for several days or at least for a sufficient number of hours to have given ample warning. In a few instances, the interval betwixt the first appearance of the disease and its full development, did not exceed four or five hours.

The general curability of the diarrhœal stage, even in localities where the epidemic was most severe and amongst classes of persons peculiarly predisposed to cholera, is evidenced by a fact stated by Dr. Greenhow, that "out of 330 cases of diarrhœa among the inmates "of St. Saviour's workhouse, only one passed into cholera and that "recovered." It would be easy, he says, "to multiply evidence on this head," and that although the severe and rapid cases of cholera "are probably death-stricken from the outset," such cases are exceptional, and by no means confute the ordinary opinion of medical men, that treatment in the earlier stage of the disease "is for the most part successful."

Diarrhœa is stated by Dr. Greenhow to have been "extremely common during the existence of cholera in all the localities." In most of the houses in which cholera occurred, diarrhœa was still more prevalent; in many no individual altogether escaped. In fact comparatively few persons in an epidemic district passed through the entire course of the visitation without some symptoms of indisposition. Referring to this general effect of the epidemic Dr. Greenhow says, "Between the cold pulseless moribund patient in the last stage of "extreme collapse and the person whose indisposition was so slight "as not to interfere with his ordinary pursuits there was, it is "true, a vast gulf, but this was spanned by a series of cases differing "from each other by imperceptible degrees of severity."

* Report of the Sanitary Committee of St. Giles and St. George, Bloomsbury.

Dr. Milroy, who made a careful inspection of the *Parish of Camberwell*, reported to the President of the General Board of Health that diarrhœa prevailed extensively in all the districts; that in the great majority of the cholera cases there had been premonitory symptoms; that the cholera cases were generally seen for the first time in collapse or verging towards it; and he states that in one district of the parish out of fifty-nine cases of cholera ten were first seen in collapse and all died, while the remaining forty-nine cases were first seen at an earlier stage and all recovered except nine.

Dr. Macloughlin states that in *Stepney Union* diarrhœa prevailed to such an extent that it was found impracticable to record all the cases, but between 5th August and 14th October 1854 there had been dispensed gratuitously as much astringent medicine as would have served for at least 15,000 persons. The persons actually known to have received medical attention for diarrhœa between these two dates were 8,610.

The medical officers and visitors stated that all the cases of cholera they had seen were preceded by diarrhœa. If the proportion of cases to the mortality held good over the whole union, the total registered deaths from cholera would represent 45,000 epidemic diarrhœa cases.

In *Poplar Union* Dr. Macloughlin states that during the five weeks preceding his inspection diarrhœa had been increasing rapidly, so much so that the medical men and their assistants were unable to spare time to take down the names and addresses of applicants for relief.

He states that the medical officers in this union had not had a single case of cholera without previous diarrhœa for a longer or shorter time. A similar statement was made by all the house-to-house visitors. In this union 9,899 persons are known to have been treated for diarrhœa.

In *Holborn Union* the medical officers reported diarrhœa to be very prevalent, and both medical officers and house-to-house visitors stated that they had not had a single case of cholera which had not been preceded by premonitory diarrhœa. From the first week in August to the 14th October there were attended by the medical officers and visitors 2,600 cases of diarrhœa.

In *St. Giles's* diarrhœa and cholera were very prevalent in the usual epidemic localities.

Every case of cholera had been ushered in by diarrhœa of a longer or shorter duration.

The medical officers and visitors attended from the beginning of August to the 14th October 4,061 cases of diarrhœa, of whom 22 died, and 120 cases of cholera, of whom 73 died. From a very extensive experience, during the present and former epidemics, Dr. Macloughlin states it as his conviction that diarrhœa is invariably the first symptom of cholera.

Dr. Mortimer Glover states that in the parts of *Deptford* and *Greenwich* which suffered so severely diarrhœa "prevailed throughout."

Severe diarrhœa rapidly passing into cholera prevailed all over the affected parts of the parishes of *St. James Westminster*, and *St. Ann Soho*, which were under the inspection of Mr. Patterson. In short, wherever the cholera existed diarrhœa accompanied it; so far as is known, almost every cholera case had been preceded by diarrhœa, and there is reason to fear that many lives were lost through inefficient measures for checking the milder stage of the disease.

Mr. Walsh cites as a striking illustration of the severity of the epidemic in the parish of Bermondsey, where no fewer than 838 persons died of cholera, that "diarrhœa seemed both by the people and "the medical officers to be taken but little account of, the former "not applying for its relief, and the latter not always recording the "relief given." This one fact shows the absolute necessity which existed for an extensive and thoroughly efficient system of house-to-house visitation, and it points very clearly to one source of the great fatality of the epidemic in that parish.

This fatal neglect of the premonitory diarrhœa Mr. Walsh ascribes partly to the medical relief of cholera having been made a parish matter, for, he says, the numerous respectable working population of Bermondsey, who were the chief sufferers, naturally held anything connected with the parish "in the greatest abhorrence."

House-to-house Visitation.—The medical relief of cholera, so far as such relief can be rendered available for diminishing the mortality from the disease, requires to be so organized and directed as to cope with and cure it in its earlier stages, instead of being mainly reserved for the fully developed form of the pestilence.

In the report and appendices of the General Board of Health, on the epidemic cholera of 1849, it was shown not to be enough for the accomplishment of these objects, to open dispensaries for the distribution of medicines to all applicants. It was proved also to be a necessity, founded on the nature of the disease, that medical relief should be sent into affected districts, instead of trusting to relief being applied for by the patients themselves. It was pointed out in the same report, that in all localities where cholera had broken out, or where an attack is imminent, diarrhœa is extensively prevalent. That the poor themselves overlook the dangerous significance of this symptom. That they are often apathetic, and unwilling to take any steps to arrest the diarrhœa. That medical aid is often not applied for till it is too late to be of use. That deaths from cholera sometimes take place without any medical attendance. That fatal cases of cholera are in reality those cases which are hardly ever seen by the medical attendant until the disease is fully developed, or until collapse has come on, and that when the epidemic is brought under treatment in its earlier stages, a very small proportion of the cases prove fatal.

These peculiarities of the epidemic had indeed been recognized as far back as the year 1832, and domiciliary visitation was tried in one or two instances.

In the first notification of the General Board of Health, issued at the very beginning of the epidemic of 1848, the local authorities were recommended to organize lay visiting committees, to ensure the

treatment of the premonitory diarrhœa. In my report to the Board on the epidemic of 1848 and 1849, I stated, that on the 7th December, 1848, during the severe epidemic cholera in Dumfries, when lay visitation was not applicable to the emergency, I recommended the Board, for the first time, to substitute medical house-to-house visitation for lay visitation, to arrest the disease in its earlier stage, by sending medical aid to the houses of the people, "by enjoining all "medical officers" (14 in number for a population of 10,500) "to visit not only cholera cases, but to make a house-to-house "visitation throughout their respective districts, to carry with them "medicines for immediate use, and to administer them on the spot "to all persons affected by diarrhœa. The visitation to be made "once a day at the least."

This recommendation was made matter of special order by the Board on the 9th December 1848, and was carried out with results so beneficial, that medical house-to-house visitation was adopted in other affected towns during the whole course of the epidemic.

House-to-house visitation was carried out to some extent in the metropolis, under the inspection of Mr. Grainger, during the epidemic of 1849, and that more good was not done by it at that time is to be attributed to the same causes which have led to its still more limited application during the late epidemic, namely, the remissness of the local authorities. Nevertheless, in 1849, there were discovered by the visitors, and brought under treatment in the metropolitan parishes, within a period of eight weeks, 43,737 cases of diarrhœa, and 978 cases approaching to cholera. Out of this whole number, of 44,715 epidemic cases, only 52 passed into developed cholera. During the same eight weeks, the visitors discovered 780 cases of developed cholera not under treatment.

All the facts stated above were perfectly well known. Moreover, during the severe outbreak of cholera in Newcastle, in 1853, organized house-to-house visitation was the means of saving many lives, and the General Board of Health, in anticipation of the epidemic attacking other districts, drew up and sent to all the parishes in the kingdom their printed Instructional Minute already mentioned, giving directions to the Boards of Guardians how to organize and carry out the measure. Every means of conveying practical information to these Boards had been adopted. But I am sorry to find from the reports of the Inspectors, that when they began their inspection they found that, with one or two exceptions of more healthy parishes, none of the metropolitan parishes had organized or prepared for putting in operation the provisions of the Instructional Minute. In a few of the parishes, after great exertions on the part of the Inspectors, and repeated recommendations on the part of the President of the General Board of Health, a few visitors were appointed, but, in most instances, nothing effectual had been done, and some of the parish authorities eventually did nothing.

In the appendix, Table III., are given the results of the medical relief measures, for a number of parishes, so far as these can be gathered from the parochial returns, and the following table gives the

total numbers of epidemic cases so treated between the middle of August and the end of October.

	Diarrhœa Cases.	Cholera Cases.
Dispensary cases -	14,453	45
Medical Officers -	47,524	3,531
Visitors - -	7,606	481
Total - -	69,583	4,057

Dr. Hassall gives the following account of the medical relief measures in operation in *Lambeth* on the 4th September, when he first inspected the parish during the height of the epidemic.

There were no day or night dispensaries.

There were no houses of refuge.

There were no house-to-house visitors.

The accommodation for cholera cases consisted of two wards in the workhouse.

The medical relief for the whole parish, with its 140,000 inhabitants, consisted of nine medical officers and two assistants.

Dr. Hassall recommended that eight day and night dispensaries should be opened; and that nine house-to-house visitors, to act under the superintendence of the district surgeons, should be appointed.

These suggestions were approved and recommended for adoption by the President of the General Board of Health, but the Lambeth Guardians declined to accede to them.

The parish was therefore left without any adequate protection against the epidemic.

The course which the parish authorities actually took was to issue a circular, offering to the medical practitioners in the parish a small payment for every case that might apply to them. But out of 120 resident medical men, 32 only consented to act on the terms proposed.*

* The following are copies of the Circular sent to the medical men in the parish, and also of the form they were expected to sign and return to the Clerk.

Lambeth Workhouse,
August 12, 1854.

SIR,

I AM directed by the Sanitary Committee of Guardians for the parish of Lambeth, to acquaint you that during the prevailing epidemic, they are prepared to enter into an engagement with yourself, and other resident medical practitioners, for the first attendance and treatment of all persons (not being private patients) attacked with diarrhœa, at 1*s.* 6*d.* per case, and with cholera 2*s.* 6*d.* per case; and that after such attendance and treatmen they be referred by you to the medical officer of the district for his attention.

If you are willing to accede to this arrangement, I am to request that you will sign the accompanying form, and transmit the same to me forthwith, and upon receipt thereof, I will forward printed forms for reference to the district medical officer.

I am, &c.
W. T. LOGAN, Clerk.

TO THE BOARD OF GUARDIANS OF LAMBETH.

GENTLEMEN,

I HEREBY undertake the preliminary attendance and treatment of all cases (not being private patients) of diarrhœa and cholera which may be brought to my notice, for the sum of 1*s.* 6*d.* per case of diarrhœa, and 2*s.* 6d. per case of cholera.

August 1854. I am, &c.

On the 7th September, Dr. Hassall found the medical relief in *Wandsworth* and *Clapham Union*, to be as follows.

There were seven district medical officers, and six assistants.

There were no day and night dispensaries, but one dispensary which was opened for a few hours daily.

There were three house-to-house visitors employed in Battersea district, the assistants of the medical officers doing duty in the other districts where necessary.

There was a resident medical officer at the workhouse, and four wards set apart for cholera cases, which were in admirable order.

There were no houses of refuge, the workhouse being used as such, when there was room. The Guardians had, moreover, formed themselves into district committees for inspecting nuisances, &c., so that upon the whole considerable provision had been made for meeting the epidemic in this union.

Considering the extent of the union, Dr. Hassall, with the sanction of the President, suggested the opening of six day and night dispensaries, in parts distant from the residences of the medical officers, and also the opening of a house of convalesence, should the epidemic continue to spread, as relapses from cholera were very common.

Several suggestions as to cleansing measures were also made.

The cleansing measures were adopted, but the other suggestions were not adopted.

Neither in Wandsworth Union, nor in the parish of Lambeth, were the medical relief measures organized on the plan of the Instructional Minute issued by the General Board of Health.

Dr. Hassall points out the entire want of uniformity in the relief measures adopted by the different Boards, and in the amount of medical relief given, and shows the necessity of the General Board of Health possessing sufficient compulsory power, for he says, "in "the majority of cases the recommendations of the Board are not "adopted at all, or else only partially so. If a fixed system of medical "relief were organized alike in all cases, the Superintending Inspectors "would undoubtedly be able to affect a much larger amount of good "than they do now. At present their time and energies are partly "spent in contests with the local authorities in order to get them to "adopt even a portion of the recommendations of the General Board "of Health."

Dr. Macloughlin reports as follows:—In *Stepney* he found that no house of refuge had been provided. That there was only one dispensary for the whole Union, and that although medicines had been placed at four police stations, there was no medical attendant to direct their distribution.

The Guardians had authorized the medical officers to appoint house-to-house visitors, but only one had been appointed.

On the recommendation of the President of the General Board of Health, additional house to-house visitors were employed, and a medical officer appointed for each depôt of medicines.

In *Poplar Union* there were four medical officers for out-door service, and eight day and night dispensaries. The Guardians had

authorized the appointment of house-to-house visitors, but none had been appointed. The medical relief measures in this case were extended by the employment of six house-to-house visitors.

In *Holborn Union* there were three medical officers for out-door service, and ten assistants, who also performed the duties of house-to-house visitors.

The arrangements in Holborn were considered to be sufficient for the then intensity of the epidemic.

In *St. Giles' and St. George's, Bloomsbury*, there were one medical officer, three assistants, and two house-to-house visitors.

In this union two additional visitors were appointed.

Dr. Walsh says, that in the *Westminster parishes*, "the Instruc-"tional Minute of the General Board of Health had not even been "seen by any one of the medical officers, nor had any organization "been made according to its provisions."

In these parishes the returns required for ascertaining the progress of the epidemic were never made, and Mr. Walsh says, "house-to-house visitation had not so much as been attempted."

In *St. Olave's Union*, Mr. Walsh states that the arrangements for attending the parish paupers were most complete; but the very completeness of the parish arrangements rendered them inapplicable for protecting the public health in the union. "The mere fact," he says, "that all applications for medical relief had to be made at the "workhouse, would necessarily limit their number to the very poorest "class."

"No attempt was made at medical house-to-house visitation."

Mr. Walsh's inspection of *Bermondsey* began on the week during which the deaths from cholera attained the maximum, namely 126, and he found that the Board of Guardians had up to that time neglected to put the directions in the Instructional Minute into operation. They had neither house-to-house visitors, nor houses of refuge, and of course they had not adopted the organization in the Minute.

At a later date they got two medical men in practice, one from a distant part of London, to visit for a few hours daily.

No additional dispensaries were provided, nor were the three additional medical officers Mr. Walsh had recommended procured.

"The force of the epidemic," says Mr. Walsh, "therefore, may "be said to have spent itself without any special organization what-"ever, calculated effectually to meet or control it, having been adopted."

"It is admitted, he says, "that during the time of severest pressure on "the medical officers, some few of the cases were not attended to, *even "of those applying for assistance*, and it is impossible not to conclude "that many passed the first and manageable stage, without seeking that "aid which a systematic house-to-house visitation would have brought "to their doors."

In *Clerkenwell*, Mr. George Glover states, that the Guardians "utterly disregarded" the recommendations of the President of the General Board of Health; that "from the first there was an openly "expressed determination not in any way to be interfered with by "the Board. The inspector was treated with discourtesy, and the

" district medical officers and their recommendations were regarded " with contempt."

During the cholera of 1849 the parish of *Bethnal-green* lost 789 of its inhabitants, and when it was inspected by Mr. Glover in the middle of the late epidemic, it had no house-to-house visitors; no house of refuge for the working classes except the Union Workhouse; the only dispensary relief for a population of above 90,000 was afforded by an arrangement with one public dispensary. This was in reality all the preparation for the epidemic that had been considered necessary, and there was no organization for saving life in the event of the disease extending its ravages. " The authorities," says Mr. Glover, " practically did nothing, although promising almost everything."

As a contrast to the neglect of duty on the part of the authorities of Bethnal-green, Mr. Glover states, that the precautions adopted in the parish of *Islington* were highly satisfactory from the beginning, and that the necessary measures were taken by the parish of *St. George-in-the-East* with great readiness, although none had been adopted before the middle of the epidemic.

The parish of *Shoreditch*, which suffered so severely during the epidemic of 1849, escaped this year with less than one-third of the mortality. In 1849 the deaths amounted to 789, and the great bulk of the mortality took place within comparatively small limits. It seemed likely that the local authorities in this case would have profited by the calamity which formerly befel this parish, and that active measures would have been adopted.

Dr. Richard King inspected the parish when the epidemic had arrived at its maximum, and reports as follows:—

" There is no house-to house visitation; neither a day nor night dispensary, nor any depôt of medicines whatever; not a single notice has been printed to inform the poor of the addresses of the only four officers who are thus silently entrusted with the important charge of administering to the population labouring under diarrhœa, as well as isolated cases of cholera. Not one of the medical officers has even been asked to make a return."

Dr. Glover states that on his first inspection the parochial authorities of *Rotherhithe* were found to have empowered the medical men to call in additional assistance, but they had not done so. There were no house-to-house visitors,—there were no dispensaries,—in fact, no provision had been made for the impending epidemic, and there was no accommodation for cholera cases. Various suggestions were made to the Rotherhithe authorities, backed by the special recommendation of the President of the General Board of Health, and Dr. Glover reports the result to have been that the *Guardians positively refused to do anything.*

At *Deptford* there was one dispensary, and three druggists had been appointed to supply medicines night and day. There was no inspector of nuisances, no house of refuge, no house-to-house visitors, and the medical attendance was deficient.

At *Greenwich* there was no house-to-house visitation, the Guardians alleging that the cholera was declining. There was no inspection of

nuisances, and there appeared to be no attempts made to abate them. There was no house of refuge, and the medical attendance was insufficient. There was no accommodation for cholera cases. Suggestions were made for remedying all of these defects; but, notwithstanding the urgency of the matter, Dr. Glover reports, that "not one of the "propositions was carried out at the time, although after some delay, "at the expiration of weeks, they were partially or in whole carried "out."

Dr. Glover says that the mode in which necessary measures for the protection of the public health are evaded, "is a striking example "of the penny wise and pound foolish system. The orphan children of "those dead of the cholera received into the union workhouse at "Greenwich alone, I am informed, will cause the union an expenditure "of £700 a year."

At *Woolwich* the Local Board of Health appointed house-to-house visitors from the first.

Mr. Patterson states in regard to *St. James, Westminster*, that at his first meeting with the parochial authorities, in the very midst of the frightful outbreak of cholera in that parish, he "was astonished to find that little or no preparation had been made." They usually have one medical officer to attend their poor, and two others had been recently appointed, but there was no organization such as that laid down in the Instructional Minute. This parish, however, under the pressure of the epidemic, adopted the necessary measures, but too late.

Dr. Greenhow thus describes the preparations he found had been made when he began his inspection of his districts. "There was," he says, "no systematic inspection of the houses occupied by the poorer "classes in epidemic localities. No houses of refuge for the temporary "accommodation of the healthy inhabitants of infected places. With "the single exception of Newington, wherein house-to-house visitors "and dispensaries had been agreed to and appointed the day before, "but were not in full and active operation till the 12th September; "no system of domiciliary visitation for the purpose of detecting and "curing the disease in its earliest stage; and lastly, no efficient "system of supervision by a medical superintendent or otherwise to "direct and vary, as circumstances might render necessary, such "imperfect and inefficient measures as were in force."

Although the Boards of Guardians had not adopted the recommendations of the General Board of Health in their integrity, some little addition had been made to their usual medical relief. An additional medical officer was appointed at Newington in one of the worst localities, and a most efficient system of inspection of the inmates was put in operation in the workhouse, by which from 160 to 180 cases of diarrhœa were discovered and treated, the result being, that, notwithstanding the unhealthiness of the locality, and the extreme severity of the epidemic in the district, only two deaths from cholera took place in the workhouse, one being that of a bedridden person, and the other case had contrived to evade the regulations.

In *St. Saviour's Union* the medical officers were authorized to call in casual medical assistance, but did not avail themselves of it, although they had on some days upwards of 100 fresh cases of diarrhœa to attend, in addition to cases of cholera. St. Saviour's Board, however, appointed a medical sanitary inspector and an assistant, by whose exertions much good was effected.

Dr. Greenhow further states, that in *St. George's parish* no additional medical assistance had been directly provided, the same objectionable system having been pursued as in St. Saviour's, namely, that of authorizing the existing medical officers to provide assistance, the Board of Guardians thus throwing the responsibility off their own shoulders to those of the medical officers, and that without any arrangement as to the amount of remuneration for the extra anxiety and expense to be incurred.

In *Chelsea* he found that "two assistant medical officers had been "appointed to relieve the regular medical officers, and to act as house-"to-house visitors, a combination of incompatible duties which "resulted in the almost entire neglect of the latter."

The imperfect and inefficient measures found in operation, and the delay in adopting more active proceedings, appear to have arisen from a mistaken sense of duty to the ratepayers, and from members of different Boards of Guardians being themselves occasionally large owners of cottage and other property.

"Such members often attend most diligently all meetings, and thus acquire an influence which overpowers that of the better disposed, who probably in all cases constitute the majority."

Dr. Greenhow states, that although the measures he found in operation were extremely defective, the recommendations of the President of the General Board of Health, made through his medium, were courteously received, and for the most part ultimately adopted, but that arrangements made during the height of the epidemic, were necessarily extremely defective. "I fear," he says, "many lives "that might otherwise have been saved, have on this occasion been "sacrificed by the absence of more systematic arrangements."

The number of house-to-house visitors was in every instance insufficient.

Dr. Greenhow says, that "there can be no doubt that in many "cases, orphans and widows, unnecessarily rendered such by the "dilatoriness of Boards of Guardians, will constitute a heavy burden "upon the ratepayers for several years to come."

The result of the whole inquiry, as regards the administration of the sanitary and medical relief measures by the Boards of Guardians, is that, generally speaking, they were inefficient in character and extent, except in some of the larger and more healthy parishes, where they were least wanted. The experience in this respect is essentially the same as that obtained during the cholera of 1849, and it demonstrates that some more suitable local authorities, with adequate powers for carrying out permanent sanitary works and measures, and for providing the working classes with adequate medical relief.

during seasons of pestilence are absolutely necessary for the metropolis.

Section V.

Causes of the defective Administration of Sanitary and Medical Relief Measures.

In considering this part of the subject, it is of importance to remark that the duties devolving on Boards of Guardians under the Nuisances Removal and Diseases Prevention Act, and the regulations of the General Board of Health, are not solely and specially the protection of the parish poor from cholera. These Boards appear to have been invested with the office of guardians of the public health mainly to avoid the necessity of erecting new local authorities, and because, to a certain extent, machinery which might be used for protecting the public health was already in their hands.

Let us next inquire on what classes of the community the force of the epidemic chiefly fell, in order that we may be able to form an estimate of the extent of protection against its ravages that was likely to be afforded by the administrative authority.

The statistics of the late epidemic are not so far complete as to afford accurate information on some points, but, from an examination I have made of the returns, I am of opinion that the weight of the epidemic of 1854, like that of the cholera of 1849, will be found to have fallen neither on the paupers nor on the richer classes of the community.

The deaths from cholera in the metropolis during the epidemic of 1849 were 14,590. Of these 329, or little more than 2·2 per cent. were gentry, 1,989 or 13·6 per cent. were tradesmen, and 10,332 or 60·8 per cent. of the total mortality fell to the lot of mechanics and their families; 1,940 or about 13·2 per cent. were undescribed.

It thus appears that, practically, the present state of the law vests the protection of the working classes and small tradesmen during periods of pestilence in the hands of the Poor law Guardians, while the chief localizing causes of pestilence have been already shown to be those requiring a totally different authority to deal with them.

Boards of Guardians, however willing, cannot sewer a street or drain a house. They cannot pave a court or control the water supply; all they really can do, is to enforce partial cleansings, and removal of nuisances, very useful no doubt if fully carried out, but requiring the Guardians to interfere with each other's interests or properties, or to place themselves in antagonism with other local authorities.

Again, when cholera is actually present, it comparatively spares their paupers, and carries off the working classes and small tradesmen, who detest parish assistance in all forms; and yet the only medical care exercised over these classes is that of the parish doctor. The dispensary is a parish dispensary. The house of refuge, one of the most important of all the preventive measures, is the parish workhouse, within which is also the parish hospital.

In *St. Giles* and *St. George, Bloomsbury,* the deaths from cholera in 1849 were 285, and the deaths from the epidemic of 1854 were 116, while the parish authorities state in their report that, "Amongst "the known paupers no fatal case has occurred, either in the poor-"house or on any of the parochial relief boards. In 1849 there were "very few fatal cases amongst the poor receiving relief; in 1854 not "one." I have reason to believe that the sanitary condition of the parish poor is considerably better than that of the working classes generally.

The incompetency of the existing local administration to deal with the epidemic immediately arrested the attention of the Inspectors who have had the worst districts of the metropolis.

Mr. Walsh points out as the result of his experience how unfit the guardians of the *poor* are to be the guardians of the *people* in a matter so important as the public health. "They are," he says, "the guardians of the *poor* against starvation and sickness, and the "guardians of the *rates* against all except the poor. Their functions "are instinctively *exclusive* not *inclusive.*"

Dr. Mortimer Glover says, in reference to the prevention of cholera, "I think my report offers sufficient evidence of the incom-"petency of Boards of Guardians in general to work a measure of "public health." In such a case as New-street, Deptford, where a very frightful outbreak of cholera occurred, he doubts whether any sanitary improvements short of the entire destruction of the property and the erection of model lodging-houses on its site, would remove the existing causes of epidemic disease. He says, "until the root "of the matter is gone into, and until the powers of the General "Board of Health are extended, or some similar central Board "has the power to compel local authorities to adopt remedial "measures, or until there be some Local Board acting under the "supervision of a central authority, nothing effectual to remedy "the existing evils will be done."

Dr. Greenhow, while remarking on the neglect of precautionary measures by the Boards of Guardians, points out that these bodies are elected for the express purpose of performing totally different duties from those devolving upon them under the Nuisances Removal and Diseases Prevention Act, that "parsimony is regarded as the one "grand virtue; hence when they are elected they conceive themselves "called upon to resist every unusual expenditure, and to cut down "the ordinary outlay to the lowest possible amount."

That this dilatoriness and false economy are exercised at a period when promptness, method, and extra expense are especially called for, and that however convenient it may be to employ the Guardians as authorities elected by the ratepayers, the doing so is entirely at variance with the efficient administration of sanitary laws especially during a severe epidemic visitation.

Dr. Greenhow further points out that notwithstanding the great sanitary evils at present existing in the parishes under his inspection, there is in reality no authority competent to deal with them. The whole sanitary administration is in a state of chaos. There is a

multiplicity of authorities with ill-defined duties—water companies, paving boards, cleansing boards, commissioners of sewers, district surveyors, boards of guardians, &c.—and it is no unfrequent occurrence to find the administrative authority of some of these Boards in the hands of parties directly interested in the continuance of the present state of matters. The practical result is that the great majority of the population of these large districts of the metropolis are left without any adequate protection against the ravages of epidemic or other preventible diseases. The evil unquestionably exists, but the remedy has yet to be provided, for no systematic supervision over the sanitary state of the metropolis is in existence.

The mischief arising from the owners of a bad class of property getting elected on Boards of Guardians and using their influence at the Board to compound for the rates on their own property is also forcibly pointed out.

Dr. Greenhow also shows that in no part of the metropolis except the City of London, which like Liverpool and a few other towns has an officer of health, is there any officer conversant with the effect of local influences on the health of the population, and hence all the sanitary measures adopted are imperfect. Dr. Hassall also states his opinion that a well organized staff of officers of health is indispensable for the metropolis.

In these opinions, as to the necessity of officers of health, which are also shared by the other inspectors, I entirely agree. The diseases of towns depend, like those of the human body, on a variety of concurring causes, evidencing the extent and nature of their operation by distinct symptoms in the inhabitants, recognizable by those who are specially conversant with the subject. So-called sanitary improvements carried out in the absence of the necessary knowledge of the effects of those local conditions which they are intended to remedy, may be in any case, as they have been in many cases, mere empiricism and waste of money. And this can only be avoided by making use of the assistance of qualified officers of health.

Section VI.

Effects of Sanitary Improvements in preventing Attacks of Cholera.

Having in the preceding pages indicated the chief removable causes of the localization of epidemic cholera in the metropolis, and the defects in existing powers and authorities, I shall conclude this report by adducing some examples of the result of sanitary improvements already in operation, as they are given in the reports of the medical inspectors.

Referring to the Borough, Dr. Greenhow states that, although the cholera deaths have in general been fewer than in 1849, the greatest diminution has occurred in the parish of Christchurch, and in the London road district of St. George's, both of which have been considerably improved, as regards their sanitary condition, since 1849.

The water supply has been improved, and is now the purest in the metropolis. The back streets, courts, and alleys, although very far from being in a good condition, have been greatly amended. Pes-

tiferous ditches have been covered, and many cesspools have been closed over and filled up, the open privies having been converted into trapped waterclosets. All of these sanitary improvements have doubtless been attended by a diminution of the intensity of the epidemic.

In the other districts of St. George's parish, and also in some parts of St. Mary, Newington, local improvements have been carried out, and have been attended with a corresponding diminution of mortality.

So far as could be observed, the severity of the epidemic bore a tolerably correct ratio to the neglect of sanitary measures.

As an illustration of immunity from attacks of cholera following on improvements, Dr. Greenhow mentions a district in St. Saviour's which used to be traversed by an open ditch. The houses along this ditch suffered severely from cholera in 1832, and again in 1849. The ditch has been covered since that date, and the neighbourhood escaped entirely during the late epidemic.

A similar result was obtained by covering one of these ditches which ran behind Wagstaff-buildings, St. Saviour's.

Jackson-court, St. Mary, Newington, suffered from cholera in 1849, but was improved shortly before the late epidemic. The court, houses, and yards were well lime-washed, and the landlord sent some chloride of lime to each house, to be used as a disinfectant. The neighbourhood was severely visited with cholera, but these houses escaped.

Bull's-gardens, Chelsea, consists of a double row of cottages. Until recently an open ditch, receiving the sewage of the houses, ran through this place, and terminated in the Ranelagh sewer. In 1849, there were 70 cases of diarrhœa, 25 of cholera, and 12 deaths among the inhabitants. Since then, the ditch has been converted into a sewer, and the privies and sinks have been connected with it. Although there is still ample room for sanitary improvement, as is evidenced by the occurrence of diarrhœa in the houses, there has been no death from cholera.

Mr. Walsh states that Jacob's Island, Bermondsey, and its immediate neighbourhood, suffered much less during the late epidemic, notwithstanding its greater severity, than it did during either of the two former visitations, which, he says, is attributable without doubt to the filling up of the foul tidal ditch since the epidemic of 1849.

Dr. Greenhow gives the following examples of sanitary improvements:

Exeter-buildings, Chelsea was formerly notoriously unhealthy, and a focus for epidemic disease. The neighbourhood has been opened up, the privies trapped and flushed daily, the court-yards and interiors of the houses were all lime-washed by the landlord, in anticipation of the cholera. These houses escaped the disease.

St. Mark's College, Chelsea, which is thoroughly drained with pipe drains, and is otherwise in excellent sanitary condition, escaped the epidemic entirely. There was less diarrhœa among the 107 inmates than the usual autumnal average.

The Duke of York's school, Chelsea, is kept in excellent sanitary condition. It contains altogether about 470 inmates; about 30 of these had diarrhœa, but there was no case of cholera.

The Normal school of the British and Foreign School Society, Borough-road, in the midst of an epidemic district, has its sanitary arrangements well attended to, and enjoyed an entire immunity from cholera.

In St. George's, Southwark, are two sets of almshouses, close to Great Suffolk-street. The sanitary arrangements of these houses are far from being perfect, but they are much better than those of the neighbourhood. All the inmates escaped the disease except one, who had been sleeping in an infected part of Kennington, and took cholera immediately on her return.

In Norfolk-street, St. Saviour's, situated in a neighbourhood where there was a great deal of disease, some dwelling-houses were erected on an improved system so as to accommodate 15 families. The sanitary arrangements are tolerably good, and there was no cholera and very little diarrhœa among the inmates.

There is a similar set of improved dwellings in Union-place, Chelsea, occupied by 12 or 13 families. There was cholera directly opposite, but there was no disease except a few cases of diarrhœa in these houses. It is enough to account for the diarrhœa that the Ranelagh sewer passes at no great distance from the houses.

Lambeth-square.—After the decline of the cholera, the President of the General Board of Health directed Dr. Fraser to make an inspection and inquiry into the condition of Lambeth-square, to ascertain to what extent the epidemic had prevailed among the population. This inquiry was directed in consequence of certain improvements in drainage having been carried out, subsequent to the epidemic of 1849.

Lambeth-square is situated in the Lower Marsh, Lambeth, not far from Westminster Bridge-road. It contains 35 well-built eight-roomed houses, renting at about 26*l.* a year each, and inhabited by a better class of artizans. At the period of the cholera of 1849, four only of the houses had waterclosets, the remainder having privies, placed over open brick drains in small back yards close to the house doors. The filth from these receptacles was conveyed away by a drain, common to five houses, passing under the middle house to a sewer in front. The smells from those privies were described as being unbearable. In addition to these causes of pestilence in the houses, there were nuisances all round the square. Close to the back walls of the house yards, there were the cesspools of houses in adjoining streets, an abominable filthy cow-yard, dung-heaps, stale fish and vegetables accumulated by costermongers, &c.

It is not surprising, therefore, that notwithstanding the comfortable circumstances of the occupants of these houses, six of them should have died of cholera during the epidemic of 1849.

Both before and subsequently to that year, the inhabitants suffered from various zymotic diseases, and also from a high average mortality. This was especially the case in 1851-52. During twelve months in

these two years, there were 80 attacks of typhus fever, scarlet fever, small pox, &c., and 24 deaths among a population of 434, being in the proportion of two cases of sickness to less than every 11 inhabitants, and one death to every 18 living.

In the beginning of 1852, a memorial was presented to the General Board of Health by the proprietor of the square, stating that for three years past the inhabitants had suffered from typhus fever, and that although 400*l.* per annum was being spent on repairs, drainage, and cleansing, the disease had reappeared. In twenty years the expenses incident to this condition of matters had been 1,250*l.*

A survey was made of the houses, and a complete system of pipe drainage with waterclosets was laid down for every house, at a cost of less than 200*l.* The smells in the houses immediately disappeared, and with them a large amount of sickness and mortality. Unfortunately, however the causes of disease around the houses remain as they were. Dr. Fraser states in his report that the people complain of the smells proceeding from the nuisances already mentioned, and hence the result of the improved house drainage, as indicated by improved health, is not so great as it might have been. The drainage came into operation in July 1852, and Dr. Fraser has given the following as the mortality in the square since July 1850.

Years.	Total Mortality.	Deaths from Zymotic Disease.
July 1850 to July 1851	9	3
July 1851 to July 1852	27	17
July 1852 to July 1853	8	1
July 1853 to July 1854	11	2

There was not a single death from cholera in Lambeth-square, during the late epidemic.

The time which has elapsed since the improvements is too short to afford reliable data as to the results, but as far as they go, they show a reduction of mortality of not much less than one-half in the two years succeeding the improvements, as compared with the two years which preceded, while the deaths from zymotic disease have decreased to nearly a seventh part of what they were.

Dr. Fraser mentions that other parts of this district of Lambeth have been improved in health, by the filling up of ditches, and in some cases by the substituting of waterclosets for cesspools.

One of the streets specially mentioned is Francis-street, with a population of 598, in which there were fourteen deaths from cholera in 1849. An open ditch passed close to this street at that period. The ditch has since been converted into a sewer, and the privies have been drained into it, while some of the houses have had waterclosets provided. During the late epidemic only one death from cholera took place in this street, and the case was one imported from Deptford.

Adjoining Francis-street is Hooper-street, in which no improvements have taken place in the privies and cesspools. In this stree

there had been eight deaths from cholera at the period of Dr. Fraser's inspection.

The discontinuing of interments in the churchyard of St. John's, Waterloo-road, is also stated to have been followed by a decrease of disease and mortality in its neighbourhood.

The following facts from the report of Dr. Fraser and Messrs. Hughes and Ludlow, on the outbreak of cholera in St. James, Westminster, and St. Ann, Soho, may be adduced as additional illustrations of the beneficial effects of improved drainage:—

"Nos. 12, 14, 15, 16, 38, and 40, Marshall-street, and 25 and 28, "Broad-street, which had been efficiently drained into the new "sewer, had all escaped cholera, while, as our tables will show, the "surrounding houses had been severely visited."

The sanitary results of the regulation of common lodging-houses, under the Earl of Shaftesbury's Act, have been so remarkable that it appears necessary to make some allowance for imperfect information on the subject.

These houses used to be dens of filth, disease, and crime, until put under the inspection of the police. Since then over-crowding has been put a stop to, and cleanliness and ventilation are enforced as far as practicable.

Mr. Grainger has shown that in a large unregulated lodging-house in Tindall's-buildings, Gray's Inn-lane, there were, in 1849, fifteen or twenty cases of cholera, and that in thirty lodging-houses in St. Giles' there were twenty-eight deaths from cholera in the same year.

Under the Common Lodging-houses Act, the police have made returns of cases of epidemic disease occurring in houses under their inspection, from which it appears that between the 1st of January and the 1st of October 1854, there were reported twenty-six deaths from cholera, in the registered lodging-houses of the metropolis, the estimated population being 32,000, and in the lodging-houses not registered, but under inspection, there were thirty-five deaths from cholera reported among a population estimated at 50,000. If ample allowance be made for unreported deaths from cholera, there will still remain sufficient proof of the great sanitary improvement that has been effected by the Act.

The parochial authorities of *St. Giles and St. George, Bloomsbury*, state that in their parishes the Common Lodging-houses Act "has effected an amount of good which can scarcely be exaggerated," but they are desirous that its powers should be extended.

Mr. Walsh states that, in the districts under his inspection, the beneficial effects of the Common Lodging-houses Act were marked, and that in the registered lodging-houses even in the worst districts the state of the privies was very much superior to what it was almost universally in the neighbourhood in a much better class of streets and houses. He says, "It is a fact that exceedingly few cases of cholera occurred in registered common lodging-houses."

If we now turn to the improved dwellings and model lodging-houses of the metropolis, we shall obtain results equally striking and satisfactory.

In the newly constructed model dwellings and lodging-houses, all the evils and neglects existing in the same class of dwellings in other parts of the metropolis are as far as possible avoided.

There are neither cesspools, ashpits, nor nuisafices; all the houses have waterclosets; and there is an abundant water supply, and suitable means of ventilation are provided.

The same improvements have been extended to the altered houses as far as it was practicable, and the results as regards the late epidemic cholera, for the seven establishments belonging to the Society for the Improvement of the Dwellings of the Labouring Classes, are thus stated in a communication received from the secretary.

1st. Model-houses for families, Streatham-street, Bloomsbury, 53 families, numbering 306 inmates, amongst whom six cases of diarrhœa have occurred, all of which speedily yielded to medical treatment.

2d. Thanksgiving model-buildings, Portpool-lane, Gray's Inn-lane, 26 families, and 66 females, or 166 inmates. Not a single case of sickness.

3d. Model-buildings, Bagnigge-wells, 23 families and 30 aged females, or 175 inmates. Not one case of sickness.

4th. Model lodging-house, George-street, St. Giles', 104 inmates, without a case of either disease.

5th. Model lodging-house, Charles-street, Drury-lane, 82 inmates, five cases of diarrhœa, very slight, and these were confined to men employed in the neighbourhood of the Tower and docks, and returned unwell. One case of cholera occurred, which can hardly be said to have been contracted in the house, as the individual had suffered from 19 days neglected diarrhœa, and was in a state of great destitution He died at King's-college hospital.

6th. Model lodging-house, King-street, Drury-lane, 25 inmates, not a case of either disease.

7th. Hatton-garden chambers, Hatton-garden, 28 inmates, but having accommodation for 58. No sickness whatever.

The houses numbered 4, 5, 6, and 7 are for single men.

Mr. George Glover, who was requested by the President of the General Board of Health to inspect the model lodging-houses of the metropolis after the decline of the epidemic, has reported in regard to the buildings belonging to the Metropolitan Association, that in the Old Pancras-road buildings, containing a population of 693 persons, there was no cholera, but a few slight cases of diarrhœa, only four of which required medical treatment

In the Soho chambers, with an average nightly population of 88, there was no cholera during the epidemic, and only seven cases of diarrhœa. This house is situated in the immediate vicinity of the houses so frightfully visited by cholera in the parish of St. James, Westminster.

In the premises in Pelham-street and Pleasant-row, with an average population of 120, there have been no deaths either from cholera or diarrhœa.

In the Albert-street chambers, Spitalfields, a lodging-house with

an average population of 200, there were three cases of diarrhœa and two cases of cholera. One of the cases, however, was taken ill in Smithfield market and was removed to the London hospital, where he recovered.

The other case, which proved fatal, took place in a man lodger who ate stale crab, offensive to the smell, for supper and breakfast, and fell a victim to an error of diet which no improved sanitary condition could neutralize.

In Albert-street dwellings for families, containing 354 inhabitants there were three slight cases of diarrhœa, but there were four deaths from cholera, all confined to one family, which shows that there must have been some peculiar cause at work in that one case.

This family consisted of a man, his wife, and eight children, who occupied a house of three small rooms, which allowed only 276½ cubic feet of sleeping space for each individual. Now experience has shown that during cholera epidemics, about 500 cubic feet are required for safety. Mr. Glover considers it probable that inefficient nourishment had also much to do with the attack.

Besides the model dwellings belonging to the two societies, there is a street of 80 tenements, in St. Georges in the East, built on the plan proposed by His Royal Highness Prince Albert, and shown in Hyde-park, at the Great Exhibition of 1851. They occupy the site of some property the inhabitants of which suffered most severely from cholera in 1849. These dwellings contain a population of about 450, and they all escaped the epidemic.

The experience so far as concerns the results of sanitary improvements is most satisfactory, although it also shows that other things require to be attended to in order to ensure security from epidemic disease.

Section VII.

Conclusions.

The facts in the preceding report appear to me to warrant the following conclusions:—

1. The chief causes which have localized epidemic cholera during the late and previous epidemics are known and removable.

2. However beneficial any temporary sanitary measures may be, such temporary measures are not enough to ward off attacks of pestilence, and that permanent sanitary works and arrangements are necessary.

3. That there is no local authority except in the city of London having the necessary powers for executing permanent works, and that new local authorities with adequate powers are requisite for the public safety.

4. That such new local authorities, besides carrying forwards the permanent sanitary improvement of the metropolis, should be intrusted with powers, under supervision of the General Board of Health, for providing houses of refuge, house to house visitation, and other similar measures required for the protection of the working-classes during extraordinary seasons of pestilence.

TABLE I.

Weekly Statistics of MORTALITY from CHOLERA, DIARRHŒA, and other Zymotic Diseases during the Epidemic of 1854.

Weeks ending	Cholera.	Diarrhœa.	Typhus.	Zymotics.	All Causes.
January 7	2	22	43	284	1,444
„ 14	2	27	49	280	1,492
„ 21	1	27	44	253	1,195
„ 28	0	30	51	230	1,178
February 4	1	31	42	263	1,204
„ 11	1	20	53	262	1,178
„ 18	0	24	47	248	1,154
„ 25	0	28	50	257	1,334
March 4	0	20	31	215	1,135
„ 11	0	19	52	254	1,343
„ 18	0	22	39	217	1,188
„ 25	0	22	41	246	1,200
April 1	0	16	40	245	1,489
„ 8	0	22	47	264	1,149
„ 15	2	18	59	254	1,087
„ 22	2	26	46	298	1,193
„ 29	0	19	56	289	1,211
May 6	0	25	51	303	1,263
„ 13	0	10	47	252	1,093
„ 20	2	17	56	301	1,188
„ 27	0	31	43	282	1,143
June 3	2	22	57	309	1,090
„ 10	1	31	64	306	1,110
„ 17	1	31	61	287	1,085
„ 24	1	38	63	301	1,153
July 1	0	25	47	249	1,290
„ 8	1	32	44	253	984
„ 15	5	46	51	270	1,015
„ 22	26	58	43	293	1,008
„ 29	133	84	40	422	1,219
August 5	399	142	44	731	1,456
„ 12	644	195	53	1,069	1,832
„ 19	729	192	45	1,112	1,833
„ 26	847	214	54	1,296	2,039
September 2	1,277	243	51	1,732	2,515
„ 9	2,050	276	67	2,558	3,413
„ 16	1,549	232	58	2,026	2,836
„ 23	1,284	190	71	1,717	2,504
„ 30	754	165	57	1,144	2,216
October 7	411	98	88	777	1,532
„ 14	249	102	53	610	1,394
„ 21	163	78	58	495	1,321
„ 28	66	46	53	371	1,228
November 4	31	33	62	359	1,252
„ 11	23	35	54	309	1,160
„ 18	12	31	54	332	1,309
„ 25	8	21	47	332	1,262
December 2	7	19	52	298	1,350
„ 9	5	19	49	328	1,331
„ 16	2	25	52	330	1,300

Table II.

Showing the comparative Mortality from Cholera during the Epidemics of 1832.* 1849 and 1854, for each Parish and Union in the Metropolis.

Unions and Parishes.	Epidemics of Cholera.								
	1854.			1849.			1832-33.		
	Population 1851.	Dths.	Deaths per 1,000	Population 1849.	Deaths.	Deaths per 1,000	Population 1831.	Deaths.	Deaths per 1,000
Paddington	46,305	93	2.0	41,267	35	0.8	–	–	–
Kensington and Brompton	44,053	186	4.2						
Hammersmith	17,760	107	6.0	68,425	225	3.3	52,981	52	1.0
Fulham	11,886	93	7.7						
Chelsea	56,538	297	5.2	53,379	247	4.6	32,371	272	8.0
St. George, Hanover-sq.	73,430	294	4.0	71,672	131	1.8	58,209	74	1.0
St. John and St. Margaret, Westminster.	65,609	420	6.4	64,109	437	6.8	–	–	5.0
Westminster	–	–	–	–	–	–	85,220	450	5.0
St. Martin-in-the-Fields	24,640	58	2.3	24,557	91	3.7	23,970	–	0.02
St. James', Westminster	36,406	484	13.0	36,426	57	1.6	–	–	–
Marylebone	157,896	344	2.1	153,960	261	1.7	122,206	355	3.0
Hampstead	11,986	14	1.1	11,572	9	0·8	8,588	–	–
St. Pancras	166,956	240	1.4	160,122	360	2.2	103,548	230	2.0
Islington	95,329	94	0.9	86,761	187	2.2	37,316	39	1.0
Hackney	58,419	71	1.2	55,152	139	2.5	34,527	8	0.2
St. Giles and St. George, Bloomsbury	54,214	116	2.1	54,062	285	5.3	52,907	280	5.0
Strand	44,460	109	2.4	44,254	156	3.5	42,015	26	0.06
Holborn	46,621	25	0.5	46,134	161	3.5	42,696	46	1.0
Clerkenwell	64,778	58	0.9	63,499	121	1.9	47,634	65	1.0
St. Luke	54,055	50	0.9	53,234	183	3.4	46,642	118	3.0
East London	44,406	85	1.8	43,495	182	4.5			
West London	28,790	125	4.3	28,829	429	9.6	123,608	605	5.0
City of London	55,932	71	1.2	55,816	207	3.8			
Shoreditch	129,257	238	1.8	104,122	789	7.6	68,564	57	1.0
Bethnal Green	90,293	190	2.1	87,263	789	9.0	62,018	345	5.0
Whitechapel	79,759	329	4.0	78,590	506	6.4	64,141	736	11.0
St. George's-in-the-East	48,376	154	3.0	47,334	199	4.2	38,505	123	3 0
Stepney	110,775	381	3.4	106,988	501	4.7	72,442	358	5.0
Poplar	47,182	208	4.0	44,103	313	7.1	25,066	101	4.0
St. Saviour's, Southwark	35,731	492	13.8	35,227	539	15.3			
St. Olave	19,375	313	15.6	19,278	349	18.1	91,501	1,128	12.0
St. George, Southwark	51,824	543	10.4	50,900	836	16.4			
Bermondsey	48,128	838	17.0	45,500	734	16.1	29,741	210	7.0
Newington	64,816	694	10.6	63.074	907	14.4	44,526	200	4.0
Lambeth	138,325	932	6.7	134,768	1,618	12.0	87,856	337	4.0
Wandsworth	50,764	421	8.0	48,446	484	10.0	33,090	46	1.0
Camberwell	54,667	553	10.0	51,704	504	9.7	28,231	107	3.0
Rotherhithe	17,807	284	15.7	17,208	352	20.5	12,875	19	1.0
Greenwich	99,365	567	5.6	95,954	718	7.5	63,564	149	2.0
Lewisham	35,835	75	2.0	32,299	96	3.0	18,426	–	–

* I have copied the data for the epidemic of 1832-3, from Mr. Grainger's report on the cholera of 1849, with the same reserve he makes, namely, that it is only an approximation, on account of the imperfection of the records.

TABLE III.

Total number of CASES of DIARRHŒA and CHOLERA returned to the General Board of Health, as having been treated in the following Parishes and Unions during the Epidemic of 1854.

Union or Parish.	Diarrhœa.			Cholera.			
	Dispensary.	Medical Officers.	Visitors.	Dispensary.	Medical Officers.	Visitors.	
Lambeth	–	3,364	–	–	427	–	
East London	–	1,514	–	–	53	–	
St. Luke, Middlesex	152	121	–	–	12	–	
West London	–	951	–	–	213	–	
Shoreditch	–	1,729	–	–	105	–	
Bethnal Green	–	409	–	–	65	–	
Hackney	–	716	–	–	16	–	
St. James, Westminster	–	2,601	–	–	237	–	Including cases discovered by house-to-house Visitors.
Strand	–	4,336	–	–	43	–	
Islington	–	2,895	–	–	67	–	
Camberwell	2,211	5,919	–	–	305	–	
St. Saviour's	924	432	338	15	102	81	
Bermondsey	256	117	30	–	39	–	
St. Luke, Chelsea	–	2,564	1,323	–	146	15	
Whitechapel	1,396	1,409	163	26	137	30	From 10th August to 23d October. First Visitor's Return on 15th Sept.
St. Mary, Newington	394	3,569	949	4	341	77	August 8th to October 7th. First Visitor's Return on 16th Sept.
St. George the Martyr	–	984	410	–	70	12	
Fulham	–	1,670	487	–	449	70	August 5th to October 1st. First Visitor's Return on 11th Sept.
Stepney Union	4,463	1,563	2,584	–	311	140	
Poplar Union	4,577	4,000	1,322	–	435	56	
St. Giles and St. George, Bloomsbury	–	4,061	–	–	120	–	Including cases discovered by house-to-house Visitors.
Holborn	–	2,600	–	–	38	–	

APPENDICES.

INSTRUCTIONS to LOCAL AUTHORITIES on PREVENTIVE MEASURES in relation to EPIDEMIC CHOLERA, under the NUISANCES REMOVAL ACTS.

THE main object of the Board in framing the accompanying Instructions has been to embody, in a form adapted to practical use, the results of experience as to the best means of meeting an outbreak of epidemic cholera.

One of the preventive measures recommended by the Board—that denominated "House-to-house Visitation," is based on the belief entertained by the medical profession, that by treating every case of diarrhœa which may be discovered among the population of a town or district visited by cholera, the ravages of this fatal disease may be to a large extent mitigated. It is well known that where cholera is epidemic, diarrhœa, usually painless, almost always prevails very extensively; and it is also known that diarrhœa of the same character usually precedes—sometimes for a few hours, sometimes for several days—the alarming symptoms which constitute developed cholera. Now the prevalent diarrhœa, in a vast majority of cases, yields to remedial measures promptly applied; and it is believed that if they had been neglected, many cases of diarrhœa thus arrested would have passed into developed cholera. As long, therefore, as cholera shows itself so difficult of cure, every plan which proposes to deal with an outbreak of this fearful disease *must provide for the immediate treatment of all cases of diarrhœa.*

It may, perhaps, at first sight appear that in order to effect the proposed object it would be sufficient to impress the foregoing plain and obvious facts upon the public, by means of placards and notices; to provide dispensaries where the poor might be supplied gratuitously with the requisite medicines, and to leave the rest to the common sense of the people. But it must be remembered that diarrhœa is a very common disease; and when painless attracts little notice, or is regarded as of no consequence. It must further be borne in mind that the principal sufferers from epidemic cholera belong to a class whose habits of life are peculiarly calculated to render them unwilling to anticipate misfortune. They may, perhaps, be taught that the filth, intemperance, and wretchedness in the midst of which they so generally live, render them peculiarly susceptible

to the worst forms of any prevalent pestilence; but unfortunately that which is the source of their danger is also the cause of their apathy. The trials which fill their thoughts are those of the day and of the hour. The pressing necessity of struggling with actual suffering begets generally a reckless indifference to merely contingent evils; and thus it has been found that even when cholera is raging in an overcrowded alley or filthy undrained court, the poor inhabitants, neglecting the commencement of the disease (which it must be recollected is without pain), rarely apply for medical aid until the disease has reached that stage when medicine is all but unavailing.

As therefore experience has shown that the poor cannot in general be induced to seek medical aid in good time, it is of the utmost importance that medical aid should seek them. This object the Board propose to effect by the system of what is called house-to-house visitation.

The Board believe that the detailed exposition of this system about to be given will afford to local authorities all the information necessary to enable them, in their respective districts, themselves to carry it into efficient operation.

Circumstances may occur under which local authorities may stand in need of counsel, and possibly even of the temporary assistance of a medical officer of the Board. The Board will deem it their duty promptly to render such assistance, as far as may be in their power whenever real occasion for it may arise; but it is equally the duty of local authorities resolutely to avail themselves of the means of preparation within their own power, and to place their dependence, not on Government aid, but rather on their own energy, vigilance, and foresight.

The instructions here given contain ample information as to the manner in which the preventive measures in general, and the house-to-house visitation in particular, may be best conducted, and as to the machinery by which it may be most successfully worked.

If the several Boards of Guardians and other local authorities throughout the country forthwith make the requisite preparation for enabling them to carry into effect, at a day's notice if necessary, the measures here recommended, according as these fall within their respective spheres of duty, every corner of the country will be furnished with a far more powerful protection against the visitation of cholera than any Government department, however vigilant and zealous, can possibly supply; whilst the sense of security which will then pervade the entire community will strip the disease of half its terrors. On the other hand, if Boards of Guardians and other local authorities should neglect the plain and obvious duties hereby imposed upon them, they must bear in mind that the responsibility of all the suffering and loss of life which may be occasioned by such neglect, will, after this notice, attach exclusively to themselves.

Provisions of Nuisances Removal Act.

The Nuisances Removal and Diseases Prevention Act, 1848, includes two sets of provisions; the one permanent, the other put in operation by an Order in Council issued under the 9th section.

The instructions which follow refer entirely to the latter, as it is under that alone that the General Board of Health exercises any power by the Act for the prevention or mitigation of epidemic disease. In dealing with these instructions it should be understood,—

1st. That *all local authorities*, having by law powers for abatement of nuisances, are called upon by the regulations and directions of this Board actively to exercise those powers, and that Boards of Guardians act only in default of such local authorities. Besides local authorities, owners and occupiers, and all others having control of premises, are charged by the Board's regulations with duties of cleansing, &c., which the Guardians should make known by handbills circulated through the Union.

2d. That the word "Guardians" in the following instructions, includes all official bodies having the management of the poor.

3d. That the authorities for administering the Poor Law in England, Scotland, and Ireland have the same power of enforcing the duties imposed on Guardians by the Nuisances Removal Act, as they have of enforcing the duties imposed on them by the laws relating to the relief of the poor. (s. 12. Nuisances Removal Act, 1848.)

4th. That, for the execution of the instructions and directions of the General Board, the Guardians may appoint or employ officers, or persons in aid of their ordinary officers, and may defray the expenses incurred in execution of those regulations and directions out of the funds of their unions, parishes, or respective combinations (section 14, Nuisances Removal Act, 1848), or out of the parochial funds, without any order of justices, when the cost does not exceed 20*s*., and when it exceeds that sum, on an order of justices (or, in Scotland, of two justices, or of the sheriff or magistrates), (s. 8, Nuisances Removal Act, 1849.) The Guardians may thus exercise a discretion as to charging the cost on the parish or union fund.

They should be guided in this discretion by the extent of the evil and the origin of the nuisance. If the former be general, the cost of removal may properly be thrown on the common fund. If the latter be local, it would seem (unless the relief by removal of the nuisance be general) to be right to throw the expense on the parish.

5th. That Guardians and their officers, or persons authorized by them, may enter on any premises where there is ground for believing that necessity may exist or arise for executing the directions and regulations of the General Board of Health. (s. 13, Nuisances Removal Act, 1848.)

DUTIES of LOCAL AUTHORITIES (other than BOARDS of GUARDIANS), Owners, Occupiers, and Persons having Control of Premises.

1. *Cleansing of Streets and Public Places.*

All surveyors, district or assistant surveyors of highways, trustees, county surveyors, and others by law entrusted with the care and management of streets and public ways and places, and where there are no public authorities so entrusted, the owners and occupiers of houses and tenements adjoining thereto, are to take the measures necessary for the frequent and effectual cleansing thereof.

2. *Cleansing, Ventilating, &c. of Private Premises and Buildings.*

The owners and occupiers, and persons having the care and ordering of all houses, dwellings, churches, buildings, and places of assembly, are to cleanse, purify, ventilate, and disinfect the same.

3. *Removal of Nuisances.*

All local authorities and persons whatsoever are to exert all the powers vested in them by law for the removal of nuisances.

4. *Speedy Interment.*

All relations of, or others in charge of the bodies of persons who have died of cholera or other epidemic disease, are to obey the directions of the medical officers of the guardians, as to the speedy interment of the dead.

The word "Guardians," as here used, means the guardians, directors, wardens, governors, parochial board, or other like officers having the management of the poor of any union, parish, combination, or place where the matter requiring the cognizance of any such officers arises, and the expression "Local Authority" means the town council, local board of health, or any trustees or commissioners for the draining, paving, lighting, cleansing, managing or directing the police of any town, borough, or place, highway board, or any other body of a like nature, or any commissioners of sewers, or any body, excepting boards of guardians and overseers, having by law powers for the removal of nuisances.

The Guardians of the poor, as superintendents of the execution of the directions and regulations of the General Board of Health, have to perform two classes of service. The first relates to cleansing duties; the second, to duties of medical precaution and relief. Both should be entered upon before the epidemic actually appears.

CLASS I.—DUTIES OF GUARDIANS IN RELATION TO CLEANSING AND REMOVING NUISANCES.

1. *Lists of Epidemic Localities.*

Direct the Clerk to make out, or cause to be made out, from the medical officers' books or other sources of information, a list* of the

* The books of the medical officers will necessarily afford much information, but the experience of the relieving officers in the haunts of poverty and disease will likewise enable them to indicate dangerous localities. [The

places within the union, where cases of cholera, diarrhœa, typhus fever, or any epidemic or endemic disease are most commonly found.

Give the list or portions of the list relative to particular districts to the several district medical officers, and require them to visit the places within the districts named in such list, and any other places within it, and examine the houses situate in places where disease may be expected to appear, as to their present condition in respect to cleanliness, or as to any existing predisposing causes of disease likely to affect the inmates.

2. *Certificates of Places other than Private Premises requiring Cleansing.*

Direct the medical officers to certify in writing to the Guardians all such places as are in a state dangerous to health, or need frequent and effectual cleansing by way of preservation against disease, and such dwelling-houses as are in a filthy and unwholesome condition, and all such nuisances and matters injurious to health as ought to be cleansed, abated, and removed, in execution of the directions of the General Board.

Direct the medical officers to certify in writing all the streets, rows, lanes, mews, courts, alleys, and passages, and public ways and places in the union, under the care of town councils, local boards of health, commissioners, trustees or surveyors, which are in a state dangerous to health, or require frequent cleansing by way of precaution against disease.—(Appendix 2, F.)

Direct the medical officer to certify in writing all streets, rows, lanes, mews, courts, alleys, and any passages, public ways, or places to which any houses or tenements adjoin, not intrusted by law to the care or management of any town council, local board of health, commissioners, surveyors, trustees, or others, which are in a state dangerous to health, or require such frequent cleansing.—Appendix 2, F.)

3. *Enforcement of Cleansing under Certificates.*

Having received these certificates of the medical officers, ascertain who are the parties by law intrusted with the care and management of the streets and public places included in Certificate

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The records of past outbreaks of cholera, where they have been preserved, will point out the localities formerly affected, and the registry of deaths will indicate the localities which suffered most.

At Newcastle an important table has been prepared, showing the numbers of deaths from cholera in each street, &c., during the recent epidemic. There can be but few occasions which will not permit of similar tables being prepared.

Where there are dispensaries and hospitals which provide out-door attendance, the records of these institutions will likewise indicate the localities where disease ordinarily prevails.

By consulting these sources of information, the clerk, or the person specially appointed to perform his duty, will be enabled to compile a tolerably accurate list of the nests of epidemic disease.

No. 1; send them copies of the certificate, and require them, in obedience to the 5th direction of the General Board, "to see "to the effectual and continued cleansing of all streets, rows, "lanes, mews, courts, alleys, and passages, and public ways and "places under their respective care and management; and to "the removal of all filth, ordure, and nuisances therefrom," under a penalty, in case of default, not exceeding 5*l.**

Warn, by printed notice, the inhabitants of the localities specified in Medical Certificate (App. 2 F.) that every occupier of a house or tenement adjoining these localities is bound by law to keep or cause to be kept sufficiently cleansed every part of the street, row, lane, mews, courts, alley, or passage, way or place, which adjoins the house or tenement occupied by him, under a penalty, in case of default, not exceeding 5*l.**

The medical officer having, where necessary, directed how or with what precautions the cleansing shall be done, and the nuisances removed, will inform the inhabitants that it is farther required, by the directions of the General Board, that "works of cleansing, and "removal of filth, ordure, and nuisances required shall be done by "effectual washing or otherwise, and with the use of fluids or "substances for preventing the escape of noxious effluvia during "the operation, when the medical officer of the Guardians, or others "authorized to superintend the execution of these directions and "regulations shall prescribe the same."

Having thus notified to the proper parties the duties required to be done by them, proceed by yourselves or by your officers or persons already employed by you, or to be specially appointed by you for this purpose, to superintend and see to the execution of the foregoing directions and regulations in all places within your jurisdiction.

Having, in the execution of the previous duty, ascertained how far the directions of the General Board have been executed, it is your duty, in default of action by bodies or persons legally responsible, yourselves to cause the places included in both certificates to be effectually cleansed, and all nuisances to be removed therefrom.

4. *Proceeding for Penalty against Defaulters.*

In all cases where the default is culpable, and the parties guilty of it can be got at, proceed for a penalty not exceeding 5*l.*, under the 16th section of the Nuisances Removal and Diseases Prevention Act, 1848. (11 & 12 Vict. c. 23.)

The preceding instructions relate entirely to out-door nuisances in streets and public places.

Those which follow relate to nuisances in houses and on private premises, and should be carried out at the same time as the pre-

* For the mode of recovering this penalty see Nuisances Removal Act, 1848, sec. 16

ceding duties, the inspector of nuisances guiding the attention of the medical officer where necessary.

As introductory to the duties which follow, it may be pointed out that, should any complaint of a nuisance under the permanent powers of the Nuisances Removal Act, signed as required by the Act, be preferred to any local authority having cleansing powers,* not being a Board of Guardians, the local authority may proceed at once in its abatement, under the Act, though an Order in Council be in force, and if such a complaint be made to the guardians, they may forward the complaint to the local authority, to be proceeded with under the Act, or if there have already been default on the part of the local authority, may themselves take proceedings, under the regulations of the General Board of Health.

In this case they cannot recover expenses incurred, but may proceed for a penalty under the 16th section of the Act of 1848.

Inspectors of nuisances should be required to make periodical returns of their inspections in books prepared for this purpose (see Appendix 2, F.), and should be furnished with all the necessary notices.†

It too commonly happens that persons are appointed inspectors of nuisances who have neither the physical nor the mental requisites for this really important office, which can hardly be filled efficiently (according to a proper conception of it) by any but a person of medical knowledge, while, for anything like satisfactory discharge of its duties, a good general education, business habits, and some practical knowledge of the simplest and most economical means of cleansing, deodorizing, ventilation, &c., are indispensable.

The inspector of nuisances should be thoroughly instructed by the legal adviser of the Board as to his powers and the forms of procedure.

Lime-washers should be employed to perform the work of lime-washing in a regular manner, until it is completed wherever required.

The lime-washing should be lime-washing strictly so called, and not whitewashing.

The lime should be applied as soon after burning as possible.

5. *Cleansing and Removal of Nuisances on Private Premises.*

Direct your inspector of nuisances to examine the houses in the district, and to make a list of all dwelling-houses in such a filthy and unwholesome state as to be a nuisance or injurious to health; and all drains, ditches, gutters, water-courses, privies, cesspools or ashpits, kept or constructed so as to be a nuisance or injurious to health; and all cases in which swine or any other animal, or

* That is, a town council, improvement commissioners, or board of guardians, as the case may be.

† Which may be procured of Mr. C. Knight, 90, Fleet Street, London, publisher to the General Board.

any accumulation of dung, manure, offal, filth, refuse, or other matter or thing are kept so as to be a nuisance or injurious to health, and to report the cases to you.

Give notice of all nuisances so reported to the owner or occupier, or person having the care of the premises, or person causing the nuisance (according to the nature of the nuisance), and require them forthwith to cleanse, whitewash, ventilate, or otherwise purify, as the case may require, such dwelling-house, or premises, or otherwise abate or remove the nuisance or matter injurious to health; and if *they neglect to do so, do the work yourselves,* and proceed against the defaulter for a penalty under the 16th section.*

Among these duties, that of enforcing ventilation is particularly important. The most fertile source of disease is the impure state of the air which results from the crowding of many persons within ill-ventilated rooms. *Not only in the dirty dwellings of the poor, but in union workhouses, other public establishments, and public lodging-houses, which present to the eye no appearance of dirt, and where drainage is not defective, the air often becomes unwholesome, from the great number of persons breathing in it, or from the means of ventilation being deficient.* In these cases, either the numbers of the occupants of the rooms should be much diminished, or a system of free ventilation should be at once introduced and enforced.

The vagrant wards of workhouses and low lodging-houses frequented by vagrants should be narrowly watched; for these are places in which cholera is apt to be fostered, and whence it may be disseminated widely amongst the surrounding population. In these establishments, then, the most scrupulous cleanliness and free ventilation should be maintained; and even the personal cleanliness of the inmates, as far as possible, enforced.

Class II.—Duties in relation to Medical Precaution and Relief.

The Clerk of every Board of Guardians on receiving copies of the present minute, should immediately send a copy to each of the medical officers of the Board, and to each of the relieving officers. He should also without delay procure such additional copies† as may be required to furnish each member of the Board of Guardians with one copy.

The Clerk should also, after a conference with the chairman of his Board, fix an early day for submitting this minute to a meeting

* If an owner neglect to provide a privy or drain, or the nuisance arising from the want of either is due to the owner, the notice to remove it should be made on him. But if he have provided these, and the carelessness of the occupier have caused the nuisance, the notice should be served on the occupier.

† Any number of copies may be obtained by application in writing to Mr. C. Knight, 90, Fleet-street, at a trifling cost.

of the Board, and for taking into consideration the suggestions contained therein.

At such meeting the Board should direct the clerk to require each of the district medical officers of the Board to furnish him, as soon as possible, with a carefully prepared list, in duplicate, of the several localities, in their respective districts, which are the usual seats of fever or other sickness in ordinary seasons, and which generally suffer most severely on the occurrence of any prevalent epidemic.

The district medical officers should also be strictly enjoined to furnish the clerk with the earliest possible intelligence of the appearance of any case of cholera, or of disease of a choleraic character, within their respective districts, or of such a general prevalence of diarrhœa as may seem to indicate an approaching outbreak of the epidemic. At the same time the other resident medical men of the town or district should be requested to do the same; as it may happen that the earliest cases may not occur to the parochial medical officer.

At this meeting, measures should be taken to ensure the services of a sufficient medical staff to carry into effect, in case of need, the system of house-to-house visitation. This staff should consist of a medical superintendent, of medical officers, one or more, and of house-to-house visitors. With reference to the house-to-house visitors it may be sufficient, as long as there is no actual outbreak, to have ascertained where these can be obtained when required; but the selection of the medical superintendent and the medical officer or officers should be proceeded with at once. Not only should the selection of the requisite number of medical men for these services be made at the earliest possible moment, but the scale of remuneration for such services should be fixed, and means should be taken to ascertain whether the persons so selected would be ready at a day's notice, and on the proposed terms, to undertake the functions respectively assigned to them, and whether their services may be relied upon as transferable to any district or locality in which the disease may prevail.

By the timely adoption of this course, the Board of Guardians, on the appearance of epidemic cholera in any part of their district, will be enabled, without delay on the one hand, or undue precipitation on the other, to call into active service just so much of their previously constituted medical staff as may suffice to deal with the particular emergency.

QUALIFICATIONS OF OFFICERS.—1. *Medical Superintendent.*

The medical superintendent should be a legally qualified and experienced member of the profession. It is desirable that he should be a resident within the jurisdiction of the Board of Guardians by whom he is employed, since that circumstance may have already furnished him with several important qualifications for his work;

as, for instance, an acquaintance with the localities affected; a familiarity with the habits of the resident poor; and a knowledge of the medical resources of each district.

It may happen that amongst the competent local practitioners none can be found whose private professional engagements will admit of his devoting himself entirely to the absorbing duties which during the prevalence of an epidemic, must devolve upon the medical superintendent. In this case, the Board of Guardians must endeavour to engage the services of a non-resident medical man.

Whenever the adoption of this course becomes a matter of necessity, it is especially important that the appointment should be speedily made, in order that the person engaged may have time to prepare himself for the efficient discharge of his duty on the first summons.

If a sudden outbreak of epidemic cholera should find a Board of Guardians unprovided with the services of a competent medical superintendent, the General Board will be prepared to recommend such an officer on receiving from the Guardians an application to that effect. Such an application may be made by telegraphic message, and it should distinctly specify the remuneration intended to be given.*

2. *Medical Officer.*

Whenever cholera becomes epidemic in any district of considerable extent, it will be found an economy of time and money as well as conducive to the prompt and proper care of the sick, to appoint a legally qualified practitioner, whose special duty it shall be to take the medical charge of the developed cases. As a general rule this should be the Union medical officer, who has to treat epidemics in ordinary seasons, and on whom therefore naturally devolves the medical treatment of the extraordinary epidemic. During the emergency, in large and populous places at least, the Union medical officer should be kept as strictly as possible to the performance of his usual duty, which is that of the care of the sick. For this reason he should have nothing to do personally with carrying into effect the visitation system, but should devote himself to the charge of the cases which the visitation discovers and sends to him. It is true that he may require assistance; and one of the first objects of the preliminary meeting should be to consider the amount of such assistance which must be given, and how it may be best supplied. The General Board would not of course venture to give Boards of Guardians any specific advice as to the *extra* remuneration which it would be right to allow the Union medical officer while performing this additional onerous duty. It may be well, however, to say that when medical men other than the parochial

* The remuneration hitherto given to medical men of the qualifications required, has been 3*l.* 3*s.* per diem, travelling expenses, and 15*s.* per night for hotel expenses. It may be observed that travelling and personal expenses will of course be saved by engaging the services of a resident medical man.

medical officers have been so employed, it has been usual to give them 31*s.* 6*d.* per day. If they should be brought from a distance, travelling expenses to and fro have been also allowed. In cases of pressing emergency, the General Board will promptly attend to any application which may be made to them for the services of qualified practitioners on the above terms.

3. *House-to-house Visitors.*

These gentlemen are usually selected from amongst junior medical practitioners, or the more advanced students in medical schools.

If there should be any medical schools, hospitals, or infirmaries in the neighbourhood of the outbreak, the requisite number of visitors will in all probability be obtained without difficulty from them. If, however, this should not be practicable, an application, by telegraph, to the General Board, stating the number required and the proposed scale of remuneration, will be immediately attended to. Visitors have usually been paid from 4*l.* 4*s.* and 5*l.* 5*s.* per week to 1*l.* 1*s.* per day. If brought from a distance they ought to be paid their travelling expenses to and fro.

Duties of Board of Guardians on the first intimation of the Approach of Epidemic Cholera.

As soon as the Board of Guardians have been warned, either that cases of cholera have occurred, that cholera has broken out as an epidemic in any part of their district, or that the unusual prevalence of diarrhœa renders such an outbreak *imminent,* the medical superintendent should be summoned to his post and should immediately obey the summons.

Preliminary Meeting of Medical Men.

On his arrival, the first step of the medical superintendent should be to call a meeting of the district medical officers and the medical practitioners of the neighbourhood. He should then explain that the object of the proposed arrangements is to furnish the poorer classes, who are likely to be the greatest sufferers from the epidemic, with such medical aid as private practitioners may be unable to supply; and that this object would, to a great extent, be frustrated if those arrangements were allowed in any way to interfere with the practice of private practitioners. It is most essential to insist on this point, and it would be well to engage that any interference with private practice on the part of any officer employed, would be followed by immediate dismissal.

The medical superintendent and medical officers should then consider and settle their combined plan of operations; the medical districts which should be included within these operations; the number of house-to-house visitors required for the special districts likely to be attacked, and for the several services; the propriety of establishing temporary hospitals for the reception and treatment

of the sick; the best sites for such hospitals, for houses of refuge, and for dispensaries; the medicines with which sufferers from diarrhœa should be supplied in the intervals which may elapse before the arrival of medical aid; the notices and placards which it would be desirable to circulate for the information of the people; the forms in which the statistical returns of the daily progress of the disease should be made and the times at which the medical superintendent, district officers, and visitors should meet.

A few suggestions on each of these points may be of use.

Districts.

The term "districts" is here used to denote the areas assigned to a given number of medical officers. The existing division of the parish or union into districts for ordinary medical relief should, as far as possible, be retained; and the districts and sub-districts included in the plan of operations should be such of the existing medical districts as may be either affected or threatened with cholera.

House-to-house Visitors.

The number of house-to-house visitors required in the various districts will, of course, depend on the number and extent of the epidemic localities, and on the extent to which the disease may actually prevail. The district medical officers and the resident medical practitioners ought to prepare themselves before coming to the meeting with the means of advising on this point.

Hospitals.

It will be right to provide some hospital accommodation not only for those who may be taken ill in the streets, or at a distance from home, but also for those who live in unhealthy places or crowded rooms. The hospitals should be well ventilated and well drained, and should be near the epidemic locality. Care should be taken to avoid any sites that may be near accumulations of refuse or marsh land or the banks of foul streams. Whenever there is a general hospital in the town, conveniently accessible, arrangements should, if possible, be made with the authorities for the reception of necessitous cases.

In the present state of uncertainty as to the mode of propagation of cholera, it is recommended that in hospitals and other places where cholera patients are under treatment, all foul linen, as soon as it is removed from the patients or from their beds, should be immersed in boiling water, or in water to which a disinfecting fluid has been added.

The vessels used for the reception of the discharges from cholera patients should be removed and cleansed without delay; and great personal cleanliness on the part of all nurses and attendants should be strictly enjoined.

The patients should generally be removed to the hospital in the horizontal posture. Each union house should therefore be provided with one or more litters, or other appropriate conveyance, for this purpose. And as the removal of patients in the extreme stages of the disease is attended with danger, this should always be done under medical advice.

Houses of Refuge.

Experience has abundantly proved that when cholera has broken out in a foul and noisome locality, or in an overcrowded, ill-ventilated, and dirty house, the best means of preventing the spread of the disease, and the consequent loss of life, is to remove the inhabitants until the necessary cleansing and other remedial measures have been executed. For this purpose some temporary places of accommodation should be provided for the people.

These places may be either hired houses, or other spacious buildings, warehouses properly fitted up, or temporary erections, as large sheds, made for the purpose. Sometimes tents, or school-rooms, unoccupied chapels, &c., have been used with advantage, and sometimes vacant rooms in the workhouse. In all cases the advantage of removing persons at once from the immediate influence of the causes of infection has been so conspicuous as to render the provision of houses of refuge one of the most important means of counteracting the spread of cholera. Great care should also be taken to select only such sites for houses of refuge as are dry, elevated, capable of free ventilation, and, if possible, isolated from other habitations. These places should always be in readiness in case a sudden outbreak of the disease should occur.

Dispensaries.

In every affected district dispensaries and depôts for medicine should be established, where, at any hour of the day and night, the poor may be able to obtain, gratuitously, medical advice and a supply of appropriate medicines.

The dispensaries should be the surgeries of the Poor Law medical officers, and, if deemed necessary, special depôts should be temporarily appointed.

In many instances the chemists' shops will be found to be the most convenient places.

In rural districts, depôts of ready prepared medicines should be established at the houses of one or more of the most intelligent and influential residents.

Notices and Placards.

These will be required for the purpose of thoroughly informing the people what they should do, and what has been provided for them. A form of notice embodying the various points to which the attention of the people should be strongly drawn is appended. (See Appendix 1.)

Returns.

In order to enable the local authorities to ascertain the state and progress of the epidemic from day to day, it is particularly desirable that returns of the cases discovered and treated, as well as of the deaths, should be daily made. These returns will also be of great national importance, as tending to improve our acquaintance with the disease, and to suggest the most efficacious means of dealing with it on a large scale. The proposed returns will come under three heads—"Visitor's Returns," "District Medical Officer's Returns," and "Returns by Medical Superintendent."

Forms for each of these returns are given in Appendix 2, together with short instructions for filling them up.

The main objects of these returns are to ascertain the exact daily progress of the epidemic among the poorer classes in every district; to determine clearly the proportion which exists between cases of diarrhœa and cholera; and the precise effect of treatment.

The returns of deaths throughout the union from cholera or diarrhœa ought if required to be furnished daily to the medical superintendent by the local registrars. The returns should be made up invariably from midnight to midnight.

Special Duties of the Medical Superintendent.

He should, immediately on entering on his duties, call a meeting of the *district medical officers*, which all the resident medical practitioners should also be invited to attend; and he should then briefly state the measures which he has to propose, and describe the duties which he and they have severally to perform.

He should then place in the hands of the medical officers, and the other resident medical practitioners, the forms of medical returns, and invite their attention to the president's letter, embodying the recommendations of the Medical Council.

He should make such arrangements as are necessary to ensure concerted action; and to enable him to trace the progress of the epidemic, request all the medical men, as well as the district medical officers, to enter the number of *new cases* that they see day by day in the short returns, which should be collected at a stated hour daily.

He may request them to enter in the same forms on every Saturday the number of cases belonging to the several heads, then under their care.

He should organize, regulate, and take the entire conduct of the visitation system immediately after the preliminary meeting already described. As the first step in the fulfilment of this duty, he should communicate to the clerk of the Board of Guardians the probable number of qualified medical assistants and of medical students that will be necessary to form the visiting staff

and should take the necessary means to engage this number, and to ensure their being in readiness to obey his summons the moment he issues it.* He should also inform the clerk of the guardians of the nature and extent of the accommodation needed for the temporary hospitals and houses of refuge; the districts which will be placed under inspection; and the dispensaries or depôts of medicine which it may be proposed to open.

His next step should be to divide the locality under his charge into districts and sub-districts for visitation purposes. As the daily visitation will be carried on chiefly in the localities which are the usual haunts of epidemic disease, and the dwelling-places of the poorer classes, care should be taken that the limits of each sub-district should be considered with reference to this basis of action. As a general rule each sub-district should embrace only so many houses as one visitor can manage effectively to visit every day.†

The next care of the medical superintendent should be to provide houses of refuge and dispensaries, and, if necessary, temporary hospitals, and to place them respectively in the best state practicable, as regards their sanitary arrangements and general efficiency.

In places where there are factories he should write to the Secretary of State for the Home Department, requesting him to authorize the factory inspectors to direct their certifying surgeons to visit such factories daily, for the purpose of inquiring as to the existence of diarrhœa amongst the workpeople, and promptly administering the proper medicines.

He should also address a circular to the proprietors or managers of every establishment where large numbers of work-people or children may be daily congregated together, inviting them to co-operate with the medical officer, and suggesting the means by which such co-operation may be made most effectual. A form for the proposed circular is annexed. (Appendix 3.)

After settling with his colleagues the remedies which in cases of emergency may be administered before the arrival of a qualified practitioner, the medical superintendent should take care that directions for the use of each form of medicine be printed in plain type, and that instructions be given to all persons charged with the distribution of the medicines, whether at the dispensaries or elsewhere, to attach the appropriate directions in the form of a label to such medicines.

The directions should never omit to state briefly the dose for adults, for young persons, and for children.

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* If the clerk has not previously received from the guardians the requisite authority to make such arrangements as the medical officer may think necessary, he should at once apply for such authority, and lose no time in acting upon it when obtained.

† The number of such houses will of course vary with circumstances; but in thickly-peopled localities, where the several stories and apartments of each house are generally inhabited as distinct tenements by different families, it has been found that one visitor may visit every day 200 separate families.

The medical superintendent will receive the reports of the inspector of nuisances, and should urge the strict observance, as far as possible, of the regulations issued by the General Board, under the Nuisances Removal and Diseases Prevention Act, more especially as to the removal of nuisances, the cleansing and whitewashing of filthy tenements, the ventilation of unwholesome rooms, the prevention of over-crowding, and the enforcement of the Common Lodging-houses Act.

He should every day send to the General Board the return (duly filled up) of which a form is given (Appendix 2, E.), accompanied by such remarks as he may deem calculated to display any interesting points connected with the progress of the disease. Any important information which he may obtain relative to outbreaks in neighbouring localities, though not in his district, should be promptly forwarded by him to the General Board. It is of the utmost importance that these returns be made regularly day by day.

He should every day, or as often as necessary, meet the medical officers, assistants, and visitors, at an appointed hour; receive their several reports, and settle (with their advice) any practical questions of administrative detail which may have been raised by the proceedings of the day; and also confer with them as to the expediency of increasing, diminishing, or re-distributing the staff of medical assistants and visitors.

When the epidemic is over, he should prepare for transmission to the General Board a succinct report on the whole history and progress of the epidemic, from its first commencement to its termination, with statistical tables and a map, marking the infected localities. The points to which the report should be chiefly devoted are suggested in the list of queries set forth in Appendix 4, and in the statistical tables.

In drawing up his report the medical superintendent should avail himself of the reports and returns of the medical officers and inspectors of nuisances.

Duties of Medical Officer.

The first duty of the medical officer is to give instant attention to the treatment of the sick. He should therefore immediately visit all cases of cholera reported to him by the visitors, or which may otherwise come to his knowledge as being destitute of medical aid. He should also give prompt attention to every case of diarrhœa which the visitors may report as requiring his assistance.

He should further execute, with all practicable efficiency, the various duties assigned to the district medical officers in the directions and regulations issued by the General Board, under the Nuisances Removal and Diseases Prevention Act, especially those which relate to overcrowded dwellings and the removal of nuisances.

He should supervise such cleansing operations as might be attended with risk if negligently performed.

His surgery should be open all day as a dispensary (see below as to duties of persons in charge of dispensaries). If his house should be one of those deemed convenient for the purpose, he should have his surgery open as a dispensary all night, for the use of one of the legally qualified medical men who might be appointed to assist him.

He should see that a supply of blankets, and other articles required by the sick, is kept at a convenient place in each district; but no such articles are to be given out except upon his written order or that of the medical superintendent, countersigned by some person authorized in that behalf by the Board of Guardians.

He should endeavour to organize a staff of nurses for the care of such poor and destitute persons as most urgently require constant attendance.*

He should, in proper cases, furnish persons with tickets of admission into houses of refuge, and no persons should be admitted into such houses without a ticket signed by him or one of his qualified assistants.

He should give such directions as may appear to him to be needful, with respect to the care, removal, and the time of interment of the bodies of persons dying of cholera.

He should, unless where other arrangements have been made, furnish the house-to-house visitors with a supply of medicines for distribution on the spot to all persons suffering from diarrhœa, and with a sufficient number of printed labels of directions adapted to each kind of medicine. He should meet daily the medical superintendent and the medical assistants, punctually at the hour appointed for the meeting. He should daily have in readiness by that hour the return for the previous day. He should, to the best of his ability, record the cases treated by him in Forms A. and B., Appendix 2, and furnish full replies, when required to do so, to the queries contained in Appendix 4. He should also be in daily communication with the house-to-house visitors of his district, and examine their returns.

Duties of House-to-House Visitors.

The house-to-house visitor will be directed in his operations, in all respects, by the medical superintendent.

He will take notes of the cases discovered by him according to the schedule entitled "Visitor's Return" (Appendix 2, C.), will make a daily return to the medical superintendent.

He will visit every house in the sub-district assigned to him, once each day, *at the least*, commencing his visitation at as early an hour in the morning as circumstances will permit. In cases of sudden outbreaks of the epidemic in confined localities, it may be necessary that the visitation should be made more frequently.

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* The provision of blankets, &c., and of a staff of nurses, will, of course, be made after communication with the clerk of the Board of Guardians and the medical superintendent.

He will hold himself in readiness to take charge immediately of any new district that may be assigned to him by the medical superintendent, whether within or without the district in which he may have previously served.

He will use his best endeavours to discover the existence of cholera and diarrhœa in the district assigned to him. He should by his manner and behaviour endeavour to gain the confidence of the people among whom he visits. He should be provided with medicines to dispense to all persons found to be suffering from diarrhœa, or from other symptoms approaching cholera.

Whenever he finds a case of diarrhœa which resists simple treatment, or which is attended with any other symptoms of approaching cholera, he will immediately report it as a case of urgency to the medical officer.

Whenever he finds a case of cholera or collapse, he will instantly despatch a messenger to the medical officer informing him of the fact.

He will not interfere in the subsequent management of such cases, except under the direction of the medical officer, and he will be most careful not to interfere with cases already under medical treatment, unless in *emergency.*

He should in a kind manner converse with the people, and endeavour to allay alarm; he will give advice as to the importance of cleanliness of person and dwelling; of ventilation, more especially of sleeping-rooms; of temperance, and proper diet.

He should strongly impress on the people the great danger of neglecting looseness of the bowels, *or diarrhœa,* and the necessity of immediate application, on the first appearance of these symptoms to the dispensaries or depôts; and in urgent cases, to the medical officer in charge of the district, at any hour of the day or night.

He should caution the people not to move about while diarrhœa is upon them, but to remain quiet, and, if possible, in bed.

He will state in his return to the medical superintendent, or to the parties in charge of the disinfectants, blankets, &c., the names of such necessitous persons as he may think should be supplied with such articles.

He will warn persons living in unwholesome dwellings, and in infected districts, of the urgency of cleansing operations, and of temporary removal from such localities, and he will endeavour to induce parties to act upon his advice.

He will report to the superintendent, or to the proper authority, all nuisances which he may discover during his visits; and any houses, rooms, or localities which may stand in urgent need of cleansing and purification.

He will meet the superintendent every day at the time appointed.

Duties of Persons in charge of Dispensaries and Depôts for Medicines.

The medical officer will, of course, superintend the arrangements for the dispensing of medicines at his own surgery.

The persons charged with the management of temporary depôts should always, when practicable, be qualified medical practitioners. They will be subject to the direction of the medical superintendent.

At each of the dispensaries, both those which are opened by day, and those which are opened by night, some *qualified* assistant should be always on the spot ready to give medical advice and medicines to all applicants.

The medicines prescribed for administration as remedies should be kept ready made up, and, as has been already pointed out, should never be given to an applicant without an appropriate printed label of directions.

Dispensers must accurately fill up returns and transmit them to the medical superintendent. These returns must also be filled up by the person in charge of the dispensary, even when he happens to be the medical officer.

In the foregoing minute the Board have not insisted in detail on the importance of the most rigid enforcement of the directions issued by the Board under the Nuisances Removal and Diseases Prevention Act, partly because they presume that Boards of Guardians are already fully alive to the duties imposed on them by Parliament in relation to those directions, and partly because they are unwilling to complicate with any collateral details the exposition of the process by which the system of house-to-house visitation may be most effectually worked.

APPENDIX 1.

(TO INSTRUCTIONS TO LOCAL AUTHORITIES, &c.)

Form of Notice to Inhabitants of Arrangements adopted to meet Epidemic Cholera.

NOTICE.

The Board of Guardians hereby inform the inhabitants that the following arrangements have been made by the authorities for the relief of the poor, and for the preservation of the public health during the persistence of Epidemic Cholera :—

MEDICAL ADVICE AND ASSISTANCE.

The town has been divided into districts, which are the same as the parochial medical officers' districts. Applications for medical advice,

attendance, and medicines (which may be had *without charge*) for cases of cholera may be made in—

District No. 1,	*District*—to Dr.
„ „ *or*	„ Dr.
District No. 2,	*District*—to Dr.
„ „ *or*	„ Dr.
District No. 3,	*District*—to Dr.
„ „ *or*	„ Dr.

All of whom are empowered and required to afford assistance with the least delay possible.

Dispensaries and Depôts for the Supply of Medicines.

It has been found that cholera is preceded by looseness of the bowels for some time, sometimes days, sometimes only hours, before the severer symptoms of cholera set in; such as sickness, vomiting, cramps, or severe purging. This diarrhœa is easily curable, but if it be neglected it may rapidly run on into cholera, when its course can scarcely be controlled, and death too often ensues.

Persons suffering from looseness of the bowels should apply, even although there be no pain of the bowels, at any of the following places, where medicines, with printed instructions, may be obtained. Persons affected in the night are urgently warned not to wait till morning, but to apply at once for medicines (or attendance, as above directed, if necessary) at

The During the Night,

where the medical officers will be in attendance.

In addition to the above, medicines will be supplied *gratuitously* During the Day by—

House-to-House Visitors.

Qualified persons will be appointed by the authorities to visit the infected localities, and to distribute medicines to those among the people who are affected with cholera, or looseness of the bowels.

Persons affected with looseness of the bowels are not, however, if they become worse during the period intervening between the visits of the house-to-house visitor, to wait till his return, but to apply to the local dispensary or depôt at once.

Nurses.

The district medical officers and assistant officers are empowered to employ certain nurses for the care of those *poor and destitute persons* who more urgently require such aid. Persons willing to become nurses will send in their names to the undersigned.

Hospital Accommodation.

Cases of cholera occurring among the poor and destitute will be received into the on the order of the medical officers of the and of the above district medical officers; but the public is earnestly cautioned against sending cases of *complete collapse* to the without medical authority, because the patient may die in consequence of the removal.

House of Reception.

A house of reception has been provided at for the reception of the families of those persons suffering under cholera whose houses are in such a state as to endanger the lives of the occupants, or where temporary cleansing works are necessary for safety. All persons are urgently warned that the only effectual measure of safety for those who inhabit unwholesome dwellings and infected districts is removal from the locality.

Houses Unwholesome and Unfit for Human Habitation.

Inspections are being made, and the owners of all such houses or parts of houses will be proceeded against where the law admits. To avoid proceedings, owners of such houses should at once endeavour to place them in a wholesome condition.

Lodging Houses.

All persons keeping lodging houses are required to register the same forthwith, in accordance with the law. Persons keeping lodgers without being registered and properly licensed, incur a penalty of £5.

Inspection of Nuisances.

Inspections of nuisances are being carried on. All complaints should be delivered in writing at the , addressed to Mr. when the most prompt attention will be paid, and the necessary steps taken for their removal, where practicable.

By order of the Board,

, Clerk of the Board of Guardians, or
Inspector of Poor.

Precautions against Cholera.

1. Apply for medicine immediately to stop looseness of the bowels, or it may bring on cholera.
2. Do not take any strong opening medicine without medical advice.
3. Beware of drink, for excess in beer, wine, or spirits is likely to be followed by cholera.
4. Drink no water which has not been boiled; and avoid that which is not quite clear and well tasted.
5. Avoid eating meat that is tainted, decayed or unripe fruit, and stale fish or raw vegetables. Cooked vegetables, or ripe and cooked fruit, in moderation, are a necessary part of diet at all times.
6. Avoid fasting too long; be moderate at meals.
7. Avoid great fatigue, and getting heated and then chilled.
8. Avoid getting wet, or remaining in wet clothes.
9. Keep yourself clean, and your body and feet as dry and as warm as your means and occupation will permit.
10. Keep your rooms well cleaned and lime-washed; remove all dirt and impurities immediately.
11. Keep your windows open as much as possible to admit fresh air; and, if necessary, use chloride of lime or zinc to remove any offensive smells.
12. If there are any dust or dirt heaps, foul drains, bad smells, or other nuisances in the house or neighbourhood, make complaint without delay to the local authorities having legal power to remove them, or if there be no such authorities, or if you do not know who they are, complain to the Board of Guardians.

APPENDIX 2.

(TO INSTRUCTIONS TO LOCAL AUTHORITIES, &c.)

Medical Forms of Return.

THIS Letter was sent with the two following Forms (A. & B.) to the Medical Practitioners of the Metropolis.

General Board of Health, Whitehall,
September 1854.

SIR,—My experience of this department, brief as it is, has strongly impressed me with a sense of the great want that is now felt of some systematic record of cases of Choleraic disease, their treatment and results, with a view to determine, in so far as may be possible, the best mode of meeting this formidable Epidemic.

Hitherto no successful attempt has been made to collect such a record; and as I find that my feeling of the want of it is very generally shared by the medical profession, I have obtained the sanction of Her Majesty's Government to the nomination of a Medical Council, representing all branches of the profession, and consisting of Dr. Paris, Sir James Clark, Dr. Alderson, Dr. Babington, Dr. Tweedie, Dr. Baly, Mr. Lawrence, Mr. Simon, Professor Owen, Mr. N. B. Ward, Mr. John Bacot, and Dr. Farr.

Under the sanction of this Council, the following form of return has been prepared for transmission to all qualified practitioners in the metropolis, to be filled up by them, with a view to obtain their experience of the present Epidemic.

The deaths from Cholera, as well as from all other causes, are registered in England; but it is evidently desirable that in this as in other countries the cases of recovery, as well as of death, should be systematically observed and recorded. But this can only be accomplished by the cordial co-operation of all the medical men in practice, which the Board hopes, in this important matter, to obtain, by acting on the advice of a Council in which all branches of the medical profession are represented.

By means of a return, in the accompanying forms, the observations of all qualified practitioners on the cases that come under their care may be collected, and made available for determining the laws which regulate Choleraic disease, and the effects of the different systems of treatment now in use.

Any return that you may make will be considered strictly confidential, but your name will be recorded as a contributor to the observations, when the general results are made known.

Under the urgent pressure of practice, to keep any accurate record of the cases will often be attended with difficulty; but this difficulty will, I feel assured, be cheerfully encountered by you, if you agree with me in thinking a record of the experience of the present generation of medical men as to this epidemic likely to contribute to the alleviation of the sufferings of mankind for the future.

The return on the other side is sent filled up, as a specimen, with blank forms. Any number of such forms you may require will be furnished by this office.

It is recommended that the forms should be filled up from day to day, and returned to the Board, on or before the 15th November next, addressed to the Secretary of the General Board of Health, and the postage of the letter enclosing the return need not be prepaid.

I have the honour to remain, Sir,
Your obedient servant,
B. HALL.

Returns of Choleraic Disease.

Form A. Diarrhœa.

Sheet of Instructions and Examples for the Record of Cases of Diarrhœa.

(Attention is particularly requested to the following instructions, as the value of the returns will depend on their uniformity.)

Instruction I.—The following *degrees or stages of the disease* should, when possible, be distinguished.

Diarrhœa.
1. *Simple.*—Alvine discharges liquid, but fœcal. Vomiting and cramps absent.
2. *Choleraic.*—Alvine discharges very copious, watery, still tinged with bile. Vomiting generally present, but not continued or urgent. Cramps absent.

All cases of "Diarrhœa" are to be entered on the sheet A. as soon as they are seen.

So soon as the "Choleraic Diarrhœa" passes into "Cholera," the fact should be recorded in the proper column of this Return (A.), and the pen should be drawn through the case, all the particulars of which should then be transferred to the "Return B.," and its subsequent course be there recorded.

Instruction II. *Absence of Stages.*—The commencement of "Choleraic Diarrhœa" is generally marked by vomiting; and when vomiting exists from the very beginning, the word "*absent*" or "*abs.*" may be written opposite "Simple Diarrhœa" in the Return.

Instruction III. *Dates.*—When the time of commencement of either stage cannot be ascertained, the words "*not known*" or "*n. k.*" should be written in the place of date; but the time of commencement may generally be stated approximately. (See Instruction III. Return B.)

Instruction IV. *Treatment.*—The nature of the treatment should be indicated in the Return as concisely as possible. When any uniform and definite plan of treatment is adopted in a series of cases, that plan should be accurately described in the space for "Remarks," and should be indicated in the Table by one or two words, as "*Conf. Arom. c. Op.*," "*Sulph. Ac.*," &c.

General Return of the Number of Cases

	Total Number of Cases.	Cases of Simple Diarrhœa not passing into further Stages.
	204	181

All Cases of Diarrhœa, with Particulars

No. of Case.	Residence when attacked (Street and Number of House).	Sex. M.	Sex. F.	Age last Birth-day.	Rank and Occupation. (If Master, write Mast. after the Name of Occupation.)	Degrees or Stages of the Disease.
	1, George Street, Rotherhithe.		F.	13	Daughter of Bargeman.	Simple Diarrhœa -
						Choleraic Diarrh. -
2	44, Thomas Street, Lambeth.	M.		2	Son of Labourer.	S. Diarrh. - -
						Ch. Diarrh. - -
3	12, William Street, Golden Square.	M.		45	Baker (Mast.)	S. Diarrh. - -
						Ch. Diarrh. - -
						S. Diarrh. - -
						Ch. Diarrh. - -
						S. Diarrh. - -
						Ch. Diarrh. - -
						S. Diarrh. - -
						Ch. Diarrh. - -
						S. Diarrh. - -
						Ch. Diarrh. - -

Remarks.

Note.—Blank Forms A. & B., which may be procured from the General the private practitioners of places in which diarrhœa and cholera are

OF DIARRHŒA NOT PASSING INTO CHOLERA.

Cases of Choleraic Diarrhœa not passing into further Stages.
23

of their Duration and Treatment.

Dates of their Commencement.		Date of Termination,			Treatment.		
					When commenced.		Its Nature. (For the mode of filling up this Column see Instruction IV.)
Day.	Hour.	in Recovery.	in Death.	in Cholera.	Day.	Hour.	
Aug. 1.	Noon.	Recov. Aug. 3.			Aug. 2.	10 a.m.	
—	—						
Aug. 3.	9 a.m.						
„ 8.	6 a.m.		Death Aug. 10, 7 p.m.		Aug. 8.	11 a.m.	
Aug. 9.	1 a.m.				Aug. 9.	noon.	
„ 10.	6 a.m.			Cholera. Aug. 10, 7 p.m. See No. 2 in Return B.	Aug. 10.	10 a.m.	

REMARKS.

Board of Health, should be placed in the hands of the medical officers and of epidemic.

RETURNS OF CHOLERA DISEASE. FORM B. CHOLERA.

Sheet of Instructions and Examples for the Record of Cases of Cholera.

(Attention is particularly requested to the following instructions, as the value of the Returns will depend on their uniformity.)

INSTRUCTION I.—*The following Degrees or Stages of the Disease* are generally recognized by the Medical Profession, and wherever it is possible should be distinguished. The terms adopted to designate them are in common use. All the stages are not present in every case.

Diarrhœa.

1. *Simple.* — Alvine discharges frequent and liquid, but fœcal. Vomiting and cramps absent.
2. *Choleraic.* — Alvine discharges very copious, watery, still tinged with bile. Vomiting generally present, but not continued or urgent. Cramps of extremities absent.

Cholera.

3. *Without Collapse.*—Alvine discharges watery, colourless, with white flakes (rice-water). Vomiting commonly urgent. Cramps of extremities frequent and severe. Eyes somewhat sunken. Temperature of surface lowered. Pulse small and feeble. Urine not secreted.
4. *With Collapse.* — Surface of face and extremities quite cold, often wet. Face and hands much shrunken, and more or less deeply livid. Cramps present. Pulse at wrist absent or scarcely to be felt. Veins of extremities contracted to dark threads. Urine not secreted. Voice usually much altered and feeble.
5. *Consecutive Fever.*—Temperature of surface more or less restored. Pulse distinct, sometimes full and throbbing. Veins more or less filled. Face less shrunken, or even full and deeply flushed. Drowsiness passing into stupor. Alvine discharges again containing bile. Urine, in most cases, still suppressed.

INSTRUCTION II. *Absence of Stages.*—The absence of any one or more of the earlier stages should be indicated by the word "*absent*" or "*abs.*" written opposite the deficient stage in the place of the date of commencement. The fact of the disease not reaching the later stages will be sufficiently shown by the mode of termination of the case, ("*death*," or "*recovery*,") being written opposite the stage at which the disease ceased.

INSTRUCTION III. *Dates.*—When the time of commencement of a particular stage cannot be ascertained, the words "*not known*" or "*n. k.*" should be written in the place of the date. But although the precise hour of the commencement of each stage cannot be determined exactly, except in rare instances, it may generally be stated approximately by taking some intermediate time between a known period when the symptoms of the particular stage were entirely absent, and one in which they were clearly developed.

INSTRUCTION IV. *Recovery.*—The date of recovery should be fixed at the time when all the symptoms of the disease, and all marked disturbances of health directly resulting from it, have disappeared, although some degree of debility may remain.

INSTRUCTION V. *Treatment.*—The nature of the treatment should be indicated in the Table as concisely as possible. When any uniform and definite plan of treatment is adopted in a series of cases, that plan should be accurately described in the space for "REMARKS," and should be indicated on the Table by one or two words, as "*Salines*," "*Calomel c. Op.*," "*Stimulants*," "*Sulph. &c.*," &c.

INSTRUCTION VI.—If any patient at the time of the attack was already suffering from another disease, the nature of that disease and the treatment used for it should be mentioned in the "REMARKS."

FORM B. - - - - - -

GENERAL RETURN OF NUMBER

Total Number of Cases.	Cases of Cholera not passing into complete Collapse.
23	15

All CASES OF CHOLERA, with Particulars of the Duration

No. of Case.	Residence when attacked (Street and Number of House.)	Sex. M.	Sex. F.	Age (last Birth-day.)	Rank and Occupation. (If Master, write Mast. after the Name of Occupation.)	Degree or Stages of the Disease.*
1.	7, John Street, Bedford Square.		F.	30	Lodging House Keeper.	Simple Diarrhœa -
						Choleraic Diarrh.
						Cholera (without collapse) - -
						Collapse - -
						Consecutive Fever -
2.	12, William Street, Golden Square.	M.		45	Baker. (Mast.)	S. Diarrh. - -
						Ch. Diarrh. - -
						Cholera - - -
						Coll. - - -
						Consec. F. - -
3.	20, Frederick Street, Hoxton.	M.		15	Son of Bricklayer.	S. Diarrh. - -
						Ch. Diarrh. - -
						Cholera - -
						Coll. - - -
						Consec. F. - -
4.	13, Mary Street, Poplar.		F.	63	Wife of Master Shoemaker.	S. Diarrh. - -
						Ch. Diarrh. - -
						Cholera - -
						Coll. - -
						Consec. F. - -

REMARKS.

NOTE.—Blank Forms A. and B., which may be procured from the General the private practitioners of the places in which diarrhœa and cholera are

Form B.

OF CASES OF CHOLERA OBSERVED.

Cases of complete Collapse.	Number of foregoing Cases in which Consecutive Fever supervened.
18	8

and Treatment of the several Stages in each Case.

Dates of their commencement.		Termination of the Case.		Dates of Death or Recovery.		Treatment in the several Stages. (For the mode of filling up this Column, see Instruction No. V.)
Day.	Hour.	Death.	Recovery.	Day.	Hour.	
Aug. 18						
„ 5	1 p.m.					
„ 5	8 p.m.					
„ 5	12 p.m.	Death.		Aug. 6.	2 p.m.	
Aug. 9	1 a.m.					
„ 10	6 a.m.					
„ 10	7 p.m.					
„ 10	11 p.m.					
„ 12	8 a.m.		Recovery.	Aug. 14		
Not	known.					
Aug. 17	11 p.m.					
„ 18	7 a.m.					
„ 18	6 p.m.		Recovery.	Aug. 20		
Absent.						
Aug. 18	Noon.					
„ 18	4 p.m.					
„	11 p.m.					
„ 20	4 p.m.	Death.		Aug. 25		

Remarks.

Board of Health, should be placed in the hands of the medical officers, and of epidemic.

FORM C.

HOUSE-TO-HOUSE VISITOR'S DAILY RETURN, with Examples as to mode of filling up the same.

Date _____ *Day of* _____ 1854.

Streets or Places within Visitor's District - -

Registration District,
Do. Sub-District,

} Within which the above Streets or Places are situated.

Street visited.		Numbers of Persons in Houses visited.	Names of Persons visited.	Sex and Age.		Occupation (distinguishing Masters).	Nature of Illness.	No. of Visit.	Advice and Prescription.
No. of	Name of Street.			M.	F.				
1	Silver Street -	9	John Jones - -	31	—	Bricklayer (Master) -	S. Diarrhœa - -	First -	Mixture No. 1.
			Jane Jones - - -	—	28	Bricklayers' Wife - -	Cholera - -	First -	See Medical Officer.
			Anne Evans - -	—	18	Bricklayers' Daughter -	Collapse - - -	First -	Do.
			Jane Evans - - -	—	15	Do. Do. -	Cholera.—Dead - -	First -	Refer to Med. Off.
2 to	Do. -	—	No Persons ill.						
9	Do. -	7	Thomas Roberts - -	56	—	Tailor - - -	Choleraic Diarrhœa -	Second	See Medical Officer.
			Jane Roberts - -	—	12	Tailor's Daughter - -	S. Diarrhœa - -	First -	Powder No. 1.

Summary of Visitor's Return.

1. Number of Houses visited by him during the Day - - - -
2. Number of Houses in which Cases of Diarrhœa or Cholera were found - - -
3. Number of Persons resident in Houses of No. 2. - - - -
4. Cases visited; viz. - - - - - - -

	Cases visited.			How treated.		
	First Time.	Second, &c. Time.	Total.	Prescribed for.	Referred to Medical Officer.	Referred to Dispensary or Hospital.
S. Diarrhœa - - - -	27	16	43	42	1	—
Choleraic Diarrhœa - - - -	13	9	22	10	22	—
Cholera without collapse - - -	8	4	12	—	12	—
Cholera,—Collapse - - - -	4	1	5	—	5	—
Cholera,—Consecutive Fever - -	1	1	2	—	2	—
Total -	53	31	84	52	42	—

I hereby certify that I commenced my Visits at o'clock A.M., and completed them at o'clock P.M., and that the above is a correct return.

Examined,

_____ Medical Officer.

_____ Signature of Visitor.

_____ Date.

Form D.

Medical Officer's Short Daily Return of Numbers.

(To be made by all Medical Officers of Districts and by Officers of Dispensaries or Hospitals.)

Registration District or Union.

Number of Cases seen by me to-day for the First Time.

—	Suffering, when first seen, from					Total Cases of Diarrhœa and Cholera.
	Diarrhœa.		Cholera.			
	Simple.	Choleraic.	Primary Stage.	Collapse.	Consecutive Fever.	
Total cases seen for First Time -	20	7	3	2	1	35
Of the above numbers the following have not been previously seen by the House-to-House Visitors or the Dispensary Officers* - - -	10	2	1	1	—	14

* Marks should be made against each case of this kind in the Forms A. and B. for the record of cases.

I hereby certify that the above is a correct return.

John Jones.

_____ *Address.*

_____ *Date.*

FORM E.

MEDICAL SUPERINTENDENT'S DAILY SUMMARY OF NEW CASES OF CHOLERA AND DIARRHŒA.

	Diarrhœa.		Cholera.			Total New Cases.
	Simple.	Choleraic.	Without Collapse.	Collapse.	Consecutive Fever.	
Cases first seen this day by House-to-House Visitors:						
By Mr. *John Jones* - -	20	5	3	2	—	30
„ *Edward Evans* - -	47	31	9	7	1	95
Cases first seen by Medical Officer to-day, EXCLUSIVE of those seen and previously returned by House-to-House Visitor:						
By Mr. *Thomas Wilkins* -	26	13	2	—	—	41
„ *Evan Roberts* - -	15	7	3	1	1	27
New cases first seen by private medical practitioners to-day:						
By Mr. *William Davis* - -	13	6	4	1	—	24
„ *Thomas Williams* -	7	5	3	1	—	16
Total New Cases - -	128	67	24	12	2	233

The above return has been accurately transcribed from the returns.

Medical Superintendent.

_____ day of _____ 1854.

NOTE.—The Medical Superintendent will incorporate the last line in his daily return to the General Board of Health; and he will carefully preserve the returns of the medical practitioners and of the house-to-house visitors from which the transcript has been made.

He will collect the returns A. and B. from the medical practitioners and from the dispensaries and hospitals at the close of the epidemic, and forward them to the General Board of Health.

FORM F.

No of House.	Name of Place.	General condition of House.			Yards and Cellars.			Water Supply.				Privies, and		
		Clean?	In good Repair?	With any Accumulation of Refuse or Rubbish?	Dry?	Clean?	Paved?	Is there separate Water Service to the Premises, and from what Company?	Receptacles.			Is there separate Privy to the House? and where?	Cesspool?	Offensive or obstructed Condition of Drains?
									What?	Where?	Condition?			

NOTE.—Every house in the infected parts should be visited by the Inspector of Nuisances or

FORM F.

Sinks, Drains.		Complaints of Public Nuisance.				Ventilation.			Lodgment of Inmates.				REMARKS.
						Windows.							
Is the Privy properly supplied with Water?	Untrapped Sinks or Drains?	Gully or Air Grating?	Offensive Trade?	Defective Scavenage?	Other Matters?	Front?	Back?	Back Door?	Number of inhabited Rooms?	Number of separate Holdings?	In which Room or Holding was recent Death or Illness?	No. of present Inmates of such Room or Holding?	

other officers, and the results should be submitted to the Medical Officer for his examination

APPENDIX 3.

(TO INSTRUCTIONS TO LOCAL AUTHORITIES, &c.)

Form of Notice to Owners and Managers of Public or Private Works and Establishments.

SIR,

I AM directed by the Guardians of the Poor of to call your attention to the accompanying notice, which they have deemed it their duty to issue to owners, managers, and overseers of public works and establishments, and others who employ or have under their care large numbers of persons.

I am, &c.

Clerk to the Board of Guardians.

NOTICE.

Experience has fully shown that during the prevalence of epidemic cholera, owners, managers, and overseers of works and establishments have it in their power, by proper precautions, to effect a great saving of life among their work-people.

It is of great importance to bear in mind that the workers in large establishments usually leave home before the time at which the house-to-house visitation can be systematically commenced, and are therefore deprived of the benefits of this most important measure of prevention.

In all places where numbers of people daily assemble at work, the first care of persons in charge of the work-people should be to make an arrangement by which an inquiry may be daily made as to the existence of looseness of the bowels among any individuals in the establishment. For this purpose, one trustworthy person in each story or room should be selected, who should be duly instructed in this duty.

This inquiry ought to extend over the whole period of the epidemic influence, and should be made in the morning, when the work-people first assemble.

The great importance of paying attention to the very first signs of choleraic disease ought to be impressed upon the people, also the advisability of promptly seeking medical aid; and this caution should be impressed as applying alike to their being attacked in the establishment warehouse, or factory, as at their own homes.

The majority of cases of cholera which prove fatal, terminate in twenty-four hours; the period for the application of preventive treatment is therefore so short, that the loss of an hour may be the loss of life.

The arrangements for the prevention and mitigation of the disease ought to be made thoroughly known, and for that purpose the hand-bills and placards of the authorities should be posted up in some conspicuous place in each story or room in the establishments and factories.

At all the establishments a supply of the medicines, with the printed instructions, adopted by the parochial medical officers, should be kept, and be readily accessible to the members of the establishments, and to the work-people.

Where establishments are superintended by their own medical officers, upon such officers should be devolved the duties of seeing that the instructions are carried out, and that proper medicines are supplied to the

work-people ; but in no cases should the duty of daily inquiry, and the providing of remedies on the spot be neglected. Where no medical officers are in charge of such establishments, special medical officers should be appointed.

A record of the persons that apply for medicine, should be kept, in order that the attention of the medical officer may be promptly called to all such cases.

The same instructions as the above apply with peculiar force to all assemblies of children at schools, and, in fact, to all persons who have the care, management, or superintendence of numbers of persons.

The principle holds equally true with regard to all domestic establishments. Thus the heads of families should make similar inquiries.

APPENDIX 4.

(TO INSTRUCTIONS TO LOCAL AUTHORITIES, &c.)

GENERAL BOARD OF HEALTH.

QUERIES.

Addressed to Dr. or Mr. _____, Medical Officer in the Town, Parish, City, or Union of _____ .

1. How long have you been employed as medical officer?
2. In what district have you been employed?
3. What has been the total number of cases treated by you of
   Diarrhœa?
   Cholera?
   Collapse?
   And how many died?
4. Will you specify any particular sanitary evils in your district which have been brought to light during the epidemic?
5. In the course of your service have you discovered any place the sanitary arrangements of which were tolerably perfect, yet where, nevertheless, cholera prevailed? Were the cases occurring in such localities exceptional cases or imported?
6. Has there been any, and what is the amount of, improvement in the sanitary condition of your district, effected since the outbreak of the epidemic? Has such improvement partaken of a temporary or permanent character?
7. Have the nuisances which you reported been abated, and to what extent?

8. Have cleansing works been instituted in the houses of the poorer classes where cholera cases or deaths have occurred?

9. Will you state the local and removable causes in the district visited by you which you believe have contributed to the localization and spread of the disease?

10. Has overcrowding prevailed, and to what extent?

11. Have you observed any peculiarities in this epidemic?

12. To what extent did the district suffer from previous epidemics?

13. Did former epidemics of cholera prevail in the same or in different spots?

14. Enumerate the spots most severely visited by cholera on former occasions, and those most severely visited in the present epidemic, and state whether in the interval between the epidemic of 1849 and that of 1854 any alteration has taken place in the sanitary condition of these two classes of localities.

(Signed) _____

(*Stating Qualifications.*) Medical Officer.

(*Date.*) _____

The Medical Officer is requested to address his replies to T. Taylor, Esquire, Secretary, General Board of Health. It is not necessary to prepay the postage.

Note.—If any other point should deserve notice, it should be inserted at the end, under the head of General or Special Remarks.

DIRECTIONS and REGULATIONS of the GENERAL BOARD of HEALTH, issued under authority of the Nuisances Removal and Diseases Prevention Act, 1848.

IN exercise of the authority vested in us, we, the General Board of Health, direct the guardians and overseers in all unions, parishes, and places in England and Wales, as follows:—

I. To have made out a list of the places within the union or parish where cases of cholera, diarrhœa, or any epidemic or endemic

disease, may have lately been frequent, and to give the list or portions of the list relating to the particular districts to the medical officer of each district to which it shall relate.

And to require the medical officer to visit the places within his district named in such list, and examine the houses as to their present condition, or as to any predisposing and removable causes of disease likely to affect the inmates.

II. To direct their medical officer to give a written list to the guardians of all places in a state dangerous to health, or needing cleansing, and of filthy and unwholesome dwelling houses, and of all nuisances within his knowledge that may be abated, cleansed, and removed under these regulations.

III. To see that all town councils, commissioners under Local Acts, local boards of health, highway boards, surveyors and district or assistant surveyors of highways, road trustees or commissioners, county surveyors, and others now by law entrusted with the control of streets and places within the parts to which these directions and regulations extend, do exert their powers for the cleansing of all places under their control, particularly those included in the above list of the medical officer.

IV. To see that places not entrusted by law to the care of any town council, local board of health, commissioners, surveyors, trustees, or others, are kept clean by owners or occupiers of houses or tenements adjoining by effectual washing or otherwise, and with the use of such disinfectants as the medical officer shall direct.

V. Where there is any default in cleansing or removing nuisances by neglect of any such town council, local board of health, commissioners, surveyors, trustees, or others, or by reason of poverty of occupiers or otherwise; to cause such places to be cleansed, and all nuisances to be removed therefrom.

VI. When any dwelling house is in such a condition as to be a nuisance or injurious to health; or,

Where upon, adjoining to, or near any premises or place as aforesaid, there is any drain, ditch, gutter, watercourse, privy, cesspool, or ashpit, kept or constructed so as to be a nuisance or injurious to health; or,

Where upon, adjoining to, or near any such premises or places, swine or any other animal, or any accumulation of dung, manure, offal, filth, refuse, or other matter or thing, shall be kept so as to be a nuisance or injurious to health;

To see that the owner or occupier, or the person having the care of such dwelling house or premises, or the person causing the nuisance, forthwith cleanses, whitewashes, ventilates, or otherwise purifies, as the case may require, such dwelling house or premises, or otherwise abates or removes the nuisance or matter injurious to health.

And if default be made herein by reason of the poverty of the owner, occupier, or other person or otherwise, and complaint shall have been made as herein-after provided;

To see that the local authority empowered to act in the place where the premises complained of shall be situate, or, if there shall be no such local authority, or the local authority shall delay for an unreasonable time,—themselves to take all proper means for carrying into effect the directions above prescribed for the owner or occupier.

VII. When any complaint under the 1st section of the Nuisances Removal and Diseases Prevention Act, 1848, or any certificate under the Nuisances Removal and Diseases Prevention Amendment Act, 1849, is made to the guardians, to cause proceedings to be taken under the first section of the former Act; or to forward the complaint to any other local authority who may have legal power to deal with the nuisance; or if there has been previous default on the part of such local authority, forthwith, if necessary, to proceed on the complaint themselves, under the said Acts.

VIII. Where they consider the case one of urgency, to cause any such dwelling house or premises to be cleansed and purified, and any such nuisance as herein-before described, to be forthwith removed and abated, without any previous complaint being made or to the local authority.

IX. To order every medical officer upon any unusual amount of diarrhœa, or any case of cholera becoming known to him within his district, to report the same to the guardians.

X. Where cholera is present or imminent;

To provide sufficient medical aid for house to house visitation, and for medical treatment of the sick, and for dispensing medicines, and issuing notices stating where such aid and medicines have been provided.

XI. To provide places for accommodating necessitous sick who cannot be properly treated in their own houses.

XII. To provide places to which may be removed the families or fellow lodgers of necessitous persons attacked with cholera, and to cause the dwellings from which persons may have been so removed to be cleansed by the owners or persons having the care of them, or, in their default, by the guardians.

XIII. On the occurrence of any case of cholera in any room occupied by one family or more, to cause the removal either of the patient or of so many of the occupants as the medical officer may deem necessary.

XIV. To provide when practicable and necessary, in case of death by cholera, for the speedy removal and interment the body.

XV. To make arrangements for obtaining daily lists of persons attacked by cholera within the Union, and for communicating the same weekly to the General Board of Health.

XVI. To appoint such medical and other officers as may be necessary to execute and superintend the execution of these Regulations, and to publish and circulate notices of the provisions of the said Acts for the prevention of nuisances, and of our directions and regulations, or such part of them as may appear expedient.

In these directions and regulations, the words "Guardians of the Poor" mean the guardians, directors, wardens, governors, or other like officers having the management of the poor of any union, parish or place where the matter requiring the cognizance of any such officers arises, and the expression "Local Authority" means the town council, local board of health, or any trustees or commissioners for the draining, paving, lighting, cleansing, managing, or directing the police of any town, borough, or place, highway board or any other body of a like nature, or any commissioners of sewers, or any body, excepting boards of guardians and overseers, having by law powers for the removal of nuisances.

Given under my hand and under the seal of the General Board of Health, this Eighth day of September One thousand eight hundred and fifty-four.

(L.S.) B. HALL.

DIRECTIONS and REGULATIONS of the GENERAL BOARD of HEALTH, issued under the authority of the Nuisances Removal and Diseases Prevention Act, 1848.

IN exercise of the authority vested in us, we, the General Board of Health direct,

I. All surveyors, district or assistant surveyors of highways, trustees, county surveyors, and others by law entrusted with the care and management of streets and public ways and places, and where there are no public authorities so entrusted, the owners and occupiers of houses and tenements adjoining thereto, to take the measures necessary for the frequent and effectual cleansing thereof.

II. The owners and occupiers, and persons having the care and ordering of all houses, dwellings, churches, buildings, and places of assembly, to cleanse, purify, ventilate, and disinfect the same.

III. All local authorities and persons whatsoever to exert all the powers vested in them by law for the removal of nuisances.

IV. All relations of, or others in charge of the bodies of, persons who have died of cholera or other epidemic disease, to obey the directions of the medical officers of the guardians, as to the speedy interment of the dead.

In these directions and regulations, the word "Guardians" means the guardians, directors, wardens, governors, parochial board, or other like officers having the management of the poor of any union, parish, combination, or place where the matter requiring the cognizance of any such officers arises; and the expression "Local Authority" means the town council, local board of health, or any trustees or commissioners for the draining, paving, lighting, cleansing, managing or directing the police of any town, borough, or place, highway board, or any other body of a like nature, or any

commissioners of sewers, or any body, excepting boards of guardians and overseers, having by law powers for the removal of nuisances.

Given under my hand and under the seal of the General Board of Health, this Fourteenth day of September One thousand eight hundred and fifty-four.

(L.S.) B. HALL.

General Board of Health,
Whitehall, September 1854.

SIR,

I am directed by the General Board of Health to enclose to you, with the regulations and directions issued by the Board in pursuance of the 10th section of the Nuisances Removal and Diseases Prevention Act, (11 & 12 Vict. c. 123) the various publications of the Board prepared for local information and guidance under this distressing visitation.

I am to impress in the strongest terms upon the minds of the parochial authorities the heavy responsibility thrown upon them by the provision of the law which makes it their business during an epidemic to see executed, or to execute themselves, the regulations and directions of the Board.

These regulations and directions are of two classes; the first class is aimed at the most prevalent forms of nuisance, (in so far as the law permits this Board to reach them) and these nuisances it is the duty of the parochial authorities to see removed by those who have the legal control of the premises, or in default of any on whom this duty may be enforced, themselves to remove them in the manner pointed out by the Act.

This is peculiarly a preventive work, and its object is to do away with the state of things which experience has proved to be most likely to bring down the epidemic in particular spots.

But when the epidemic comes, it is too late to trust for safety to the execution of these directions only.

At this point that other class of the Board's regulations and directions which provides for medical relief should come into play.

The directions on this point are general and brief.

But with them is sent a minute of instruction, which sets out in the fullest detail the arrangements by which medical aid may be placed within reach of all who require it, and, where necessary, house-to-house visitation established, houses of refuge provided, and all other measures taken which the actual presence of the epidemic renders necessary.

If the will to do this duty exist on the part of the parochial authorities this minute supplies all the information required to enable them to carry out their duty in practical working.

Where arrangements in accordance with that minute have been conducted in a judicious and not niggardly spirit, experience has proved that the ravages of the epidemic may be confined within very narrow limits.

It should not be forgotten that the duty of making such arrangements is not one imposed on the parochial authorities by humanity only, but that it is also a work laid upon them by the law, the neglect of which is made punishable by the statute which imposes it. For although the members of parochial bodies are elected of their own free will, yet, when they have voluntarily accepted the responsibilities of an office, the law will not allow them to neglect their duties to the inhabitants of the district they are acting for, in so far as the Legislature has intrusted them to their care.

The purpose of this letter is to state the Board's view of the nature of these duties and responsibilities (in reference to epidemic disease), in order that local authorities may not be able to avail themselves of the plea of ignorance, should the imputation of neglect be brought home to them.

I have the honour to be, Sir,
Your obedient Servant,
T. TAYLOR, *Sec.*

REMOVAL OF NUISANCES.

The intimate connexion between filth, foul smells and disease being assumed to be generally admitted, and many applications being daily made to this Board either to remove nuisances, or to give information how the removal of nuisances can be effected, the following plain directions for that purpose, will, the Board believe, be found useful at this moment.

The nuisances which may be dealt with under "The Nuisance Removal and Diseases Prevention Act, 1848," (11 and 12 Vict. 123), and the Regulations and Directions of the General Board of Health, issued in pursuance of that Act, broadly classed, are of two kinds.

1st. Nuisances removable by cleansing, such as filthy house walls, overcharged cesspools, unscavenged streets, foul dust bins, manure heaps, ash-pits, dirty pigsties, &c.

2d. Nuisances requiring the construction of works for their removal, such as houses unwholesome for want of drains, accumulations of liquid refuse requiring drains to carry them off, &c.

Consider to which of these classes the nuisance you complain of belongs.

I. How to get rid of nuisances removable by cleansing.

If to the 1st class, *address a short intelligible complaint of the nuisance, in writing, to any existing body having authority to make local improvements;* as the town council, board of trustees, or commissioners for the repair, paving, lighting, cleansing or draining of the highways, the highway board, or any other similar body; or, in default of any of them, to the Board of Guardians.

The Board's regulations prescribe no particular form for this complaint, but it should be precise in describing the place or giving the address of the premises where the nuisance is.

It is the duty of each and all the above local authorities, immediately on the receipt of such complaint as above, to make inquiry and take such measures as may be necessary for its removal, or in default of their doing

so, the Guardians, under the regulations and directions which have been issued to them, are to make inquiry into the complaint, and if they find that it is well-founded, to call upon the persons having power by law to remove it, to do so.

If these persons neglect or omit to remove the nuisance,

The Guardians have power, and it is their duty to remove it, instead of these persons—and they are empowered to proceed against the defaulters (if culpable) for a penalty under the Act, up to *5l.*

II. How to get rid of nuisances removable by constructing works.

To do this requires a less summary and simple process.

The proper mode of proceeding in this case is not, as in the former, under the regulations and directions of the General Board of Health, but under the 1st section of the Nuisances Removal Act, addressed to *any existing body having authority to make local improvements;* as the town council, board or trustees or commissioners for the repair, paving, lighting, cleansing, or draining of the highways, the highway board, or any similar body; or, in default of any of them, to the Board of Guardians in the form given by that Act.

A complaint must be signed by two householders, or the nuisance must be certified to the Guardians by the medical relieving officer of the union, or, if it exist in or about a common lodging-house, by a police constable, or inspector of common lodging-houses.

On this the local authorities, and, in default of them, the Guardians, are bound, after examination into the case, or without examination, on the written certificate of two legally qualified medical practitioners, to complain before a magistrate, who can summon the owner or occupier of the premises where the nuisance exists, before two justices (or in London before any police magistrate) and on hearing of the summons an order may be made for the removal or abatement of the cause of complaint.

If this order be not obeyed, it is the duty of the local authority instituting the complaint to carry the order into effect, and the cost falls on the persons on whom the order was made.

As nothing in the Nuisances Removal Act is to interfere with the jurisdiction of the Commissioners of Sewers (sect. 5), when the order is one which involves an authority from them, it should require the execution of the work conformably to the regulations of those Commissioners, who have declared themselves ready to co operate with the local authorities and Guardians to the utmost in carrying out the provisions of the Act.

They will furnish information, at their district offices,* as to the state of the sewerage of particular localities.

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* Branch Office for the Tower Hamlets and Poplar districts, and Finsbury division—No. 15, Great Alie-street, Goodman's-fields. Office hours 9 o'clock A.M., to 4 P.M.

Principal office of the Commission, and branch office for the Holborn division, and eastern and western divisions of Westminster and Regent-street, and Regents-park district—1 Greek-street, Soho. Office hours, 9 o'clock A.M., to 4 o'clock P.M.

Branch office for portions of the Ranelagh Counters Creek, and Fulham and Hammersmith districts—No. 22, Inverness-road, Bayswater. Office hours, 10 o'clock A.M., to 12 o'clock at noon.

Branch office for portions of the Ranelagh Counters Creek, and Fulham and Hammersmith districts—No. 45, Grove-place, Brompton. Office hours, 10 o'clock A.M., to 12 o'clock at noon.

Branch office for the whole of the district south of the River Thames—No. 64, Borough-road. Office hours from 9 o'clock A.M., to 4 o'clock P.M.

Short Recommendations to Guardians in times of Choleraic Disease,

In execution of the powers derived from the regulations and directions of the General Board of Health, issued under Order in Council.

1. Divide your union amongst committees of the guardians.

2. Give your medical officers assistance if they require it.

3. Direct your chief attention to places where diarrhœa prevails, or where fevers or other epidemic disease have generally been most prevalent. Your medical and relieving officers know these places.

4. Look to the cleansing of roads, streets, and courts; and see that surveyors, paving and improvement commissioners, and others, having by law power to cleanse, carry out their powers.

5. In their default, or when they have no power, yourselves see to the cleansing of such streets, roads and courts. In the courts of poor neighbourhoods, where refuse is thrown on the public way, wash the surface daily with streams of water.

6. Appoint a committee for the receipt of complaints of nuisances, and see that the proper officer attends to such complaints, and reports what he does therein.

7. In all cleansing operations, where foul smells may arise, let disinfectants, such as quick-lime, peat-charcoal, chloride of lime or of zinc, or chlorine gas, disengaged by pouring sulphuric acid on common salt, in the proportions of a wine glassful of the acid (common oil of vitriol) to a pint of salt, be freely used.

8. Filthy houses should be lime-washed, and accumulations of all kinds promptly removed without expense to the occupant, when poor.

9. Let the paramount importance of free ventilation in all houses be constantly and most urgently inculcated.

10. Insist on the greatest possible cleanliness in the vagrant wards of union-houses, and in common lodging-houses; and enforce, as far as possible, personal cleanliness on the part of the inmates of those places.

11. Look to the water in your district, and adopt every practicable means to ensure its supply in a state of purity.

12. Direct your medical officers to report to you any unusual prevalence of bowel complaint or diarrhœa, and any case of cholera, in their respective districts.

13. On the earliest appearance of choleraic disease, assemble your medical officers, and carry out, as far as may seem necessary, the instructions of the General Board of Health as to preventive measures, dispensaries, and medical aid, which instructions have already been supplied to you by that Board.

14. Make known your arrangements for relief by plain hand-bills, freely circulated.

15. Give warning, by hand-bills, of the importance of applying, on the first symptoms of diarrhœa, to your medical officers, for advice and medicine, and that the same will be given gratuitously.

LONDON:
Printed by GEORGE E. EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty,
For Her Majesty's Stationery Office.

Digitized with financial assistance from the
Government of Maharashtra
on 02 July, 2018